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Bibliography on Balloons

5 May 1954 No. 5

METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY is a monthly publication devoted to:

A. Current Abstracts in English on important meteorological literature in every language.

B. Bibliographic references to other items of interest to the profession.

C. Selective, annotated bibliographies on subjects of immediate and special interest to meteorologists.

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 5 MAY, 1954 No. 5

SPECIAL FEATURE IN THIS ISSUE

A Selective Annotated Bibliography on Balloons

(For complete table of contents see back cover)

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FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to bring to the attention of meteorologists current literature in their field and in related fields and to provide bibliographic information on various subjects, as interest demands.

Part I contains abstracts of current literature in the fields of meteorology, oceanography, etc., arranged according to the Universal Decimal Classification.

Part II of each issue comprises a special annotated bibliography of important references on a special subject. No attempt is made to prepare exhaustive bibliographies; instead, the aim is to include a representative cross section of the various aspects of a subject.

Bibliographies published in the successive issues of Vol. 1, 1950 were:

1) **Atmospheric Pollution,** 2) **Aerobiology,** 3) **Cloud Physics,** 4) **Hail,** 5) **Tornadoes,** 6) **Volcanic Dust,** 7) **Climatic Changes,** 8) **Thunderstorms,** 9) **Icing,** 10) **Acoustical Propagation** and 11) **Evaporation.**

Those published in Vol. II, 1951 were:

1) **Extended Forecasting,** 2) **Long Range Forecasting,** 3) **Soil Temperature,** 4) **Constants, Tables, etc.,** 5) **Climate of Near East,** 6) **Climate of Middle East,** 7) **Special Winds,** 8) **Radar Storm Detection,** 9) **Condensation Trails,** 10) **Climate of Northeast Africa** and 11) **Mountain Meteorology.**

Other bibliographies previously published were:

No.	Mo.	Vol. III, 1952	Vol. IV, 1953
1.	Jan.	**Climate—Northwest Africa**	**Turbulence Theory**
2.	Feb.	**Carbon Dioxide**	**Turbulent Diffusion and Exchange**
3.	March	**Climate—Argentina, etc.**	**Frost and Frost Forecasting**
4.	April	**Dew**	**Climate of Australia and New Zealand**
5.	May	**Objective Forecasting**	**High Level Winds (500–100 mb)**
6.	June	**Stratus Forecasting**	**High Level Winds (above 100 mb)**
7.	July	**Urban Climatology**	**Jet Stream**
8.	Aug.	**Climate—Central Africa**	**Radiation Bioclimatology**
9.	Sept.	**Visibility**	**Climatology of the Pacific**
10.	Oct.	**Glaze and Rime**	**Auroras**
11.	Nov.	**Free Air Turbulence**	**Sferics**

Bibliographies published this year are:

1. **General Oceanographic Meteorology,** Vol. V, No. 1, Jan. 1954
2. **Climate of Southeast Asia and Netherlands Indies,** Vol. V, No. 2, Feb. 1954
3. **Physics of Auroras,** Vol. 5, No. 3, March 1954
4. **Tropopause,** Vol. 5, No. 4, April 1954
5. **Balloons,** Vol. 5, No. 5, May 1954

Forthcoming bibliographies will be:

6. **Numerical Forecasting,** Vol. 5, No. 6, June 1954
7. **Radiation Data,** Vol. 5, No. 7, July 1954

Other bibliographies in preparation are:

Actinometers
Arctic Meteorology
Climate of the Arctic
Engineering Meteorology
Fog Forecasting
Machine Methods in Meteorology
Microwave Propagation
Night Airglow
Ozone
Snow Cover
Synoptic Aerology
Tropical Cyclones
Vertical Currents
Wind Waves and Currents

Part III contains a listing of the contents of those journals which are primarily meteorological. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. In the December issue cumulative author, subject, geographical and journal indexes are published.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where the material may be found. The Union List of Serials (Gregory) is the source of most of the symbols used. In some cases, where no symbol has been assigned to a library, one will be devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DSG:	U. S. Army Medical Library, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory (and American Meteorological Society) Library, Milton, Mass.
MCM:	Massachusetts Institute of Technology, Cambridge, Mass.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
!	before an entry indicates a synoptic case history study accompanied by charts.

Geographic locations are in the English form rather than the form used locally, for example, Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwise stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to the Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months are abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Number (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus an entry will read as follows:

Meteorologische Rundschau, 2(5/6):146–151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, *Jahrgang* 2 (Vol. 2), *Heft* 5/6 (No. 5/6), *pages* 146–151, May/June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

WORKS OF SPECIAL INTEREST

5.5–1 523.7:525(02)

*†Aller, Lawrence Hugh (*Michigan Univ.*), **Astrophysics: the atmospheres of the sun and stars.** N. Y. Ronald Press Co., **1953.** 412 p. numerous figs., tables, bibliog. at end of each chap., eqs. **DLC**—The basic astronomical, physical and chemical knowledge necessary for study of solar or stellar atmospheres, comprises the first 5 chapters of this new textbook. Atomic and molecular spectra, gas laws, equations of state, turbulence, excitation, ionization, dissociation, emission and absorption are the major topics covered in this part of the book. Chap. 6 takes up the radiation of the stars, Chap. 7—the continuous spectra of the sun and stars, Chap. 8—the Fraunhofer spectrum, Chap. 9—solar phenomena and their terrestrial relationships. It is this last chapter that contains much of use to the meteorologist working along lines of upper atmosphere physics, radio propagation or long range forecasting. Solar prominences, flares, granules, sunspots, faculae, floccula, chromospheric eruptions, solar rotation, the hydrogen convective zone, magnetic fields of sunspots, disk phenomena, spectroheliograph studies, electron density and temperature of chromosphere, the corona and its spectrum, theories of coronal excitation and radio frequency radiation from the sun, followed by a brief summary of latest work on solar-terrestrial relationships are all discussed thoroughly and are well illustrated. The bibliographies are arranged according to sub-subject in each chapter. Numerous data are presented throughout the text. The most valuable material in the first part of the book is that which has to do with atomic structure and spectra—necessary for understanding work on atmospheric spectroscopy. *Subject Headings:* **1. Astrophysics 2. Solar-terrestrial relationships 3. Solar influences 4. Textbooks.**—*M.R.*

5.5–2 551.578.46(494)

Davos, Switzerland. Eidgenössisches Institut für Schnee- und Lawinenforschung, **Schnee und Lawinen im Winter 1950/51.** [Snow and avalanches in winter 1950/51.] *Davos, Switzerland. Eidgenössisches Institut für Schnee- und Lawinenforschung, Schnee und Lawinen im Winter, Winterbericht,* No. 15, **1952.** 231 p. 111 figs., 93 tables, bibliog.p . 230–231. **DWB**—A detailed scientific and economic report on the catastrophic avalanche winter 1950/51 written by a team of five authors. The weather conditions are outlined, presenting relative precipitation maps (up to several hundred % above normal) and giving detailed meteorological data *in extenso* for special experimental fields together with snow profiles, as well as summarizing snow data for the whole country with data *in extenso* for selected stations. Long series of precipitation records in the single winter months observed at four stations since 1863, are shown on p. 93–94. Time height cross sections of air masses and surface maps are presented for the catastrophic weather situations, which were connected with the invasion of many maritime tropical air masses from the Atlantic. Finally, an account of the destructive work of the avalanches is presented, evaluating the total loss as 42 million Swiss francs. *Subject Headings:* **1. Avalanche research 2. Switzerland. I. Zingg, Th. II. Finder Gand, H. R. III. Schild, M.**—*A.A.*

5.5–3 551.579(661.1)

†*Dubief, Jean (*Univ. of Algiers*), **Essai sur l'hydrologie superficielle au Sahara.** [Study of the surface hydrology of the Sahara.] Algiers, Direction du Service de la Colonisation et de l'Hydraulique, Service des Etudes Scientifiques, **1953.** 457 p. 35 tables, 41 figs., 4 maps (colored, folded, in pocket), numerous bibliogs. **DWB**—An important advance for hydroclimatic exploration of the Sahara Desert. Detailed discussion is devoted to rainfall condi-

tions with a mathematical frequency analysis of annual precipitation, giving also for separate stations the number of years without or almost without rain, mean rainfall and its variability, rainfall intensity, frequency and seasonal variation. The source of precipitation is discussed from the viewpoint of dynamic climatology, showing the southern limit of rains originating from the polar front and the northern limit of monsoon rainfall. Most of the rainfall is connected with depressions coming from equatorial regions. Sample maps show typical rainfall distribution in the different seasons. Some remarks are made on snow in the Sahara. Evaporation from free water surfaces and from soil is commented on. Very detailed summaries characterize each basin, from the topographical view with maps of the basins and comparing the seasonal frequency and duration of flash floods with the frequency of rainfall. The soil moisture relations are briefly analyzed and the effect of the floods on the economic development is described. For the relation between the annual precipitation and runoff the equation R [mm] $=0.75$ $(P-8)$ is adopted, which was found by SUTTON for Egypt. A detailed map (1:10.000.000) shows the distribution of annual rainfall north from 4°N, others the main basins and the location of areas where surface runoff occurs. *Subject Headings:* **1. Regional hydrology 2. Flash floods 3. Precipitation maps 4. Precipitation data 5. Arid zones 6. Sahara Desert.**—*A.A.*

5.5–4 551.583.2:551.311.1(02)

†Drygalski, Erich von and Machatschek, Fritz, **Gletscherkunde.** [Glaciology.] Vienna, Franz Deuticke, **1942.** 261 p. photos, diagrs., bibliogs. **DLC**—A comprehensive treatise on glaciers covering the following subjects: the history of glaciology; the snow region and snow boundary; glacier types (regenerated glaciers, thickness of glaciers); the life cycle of glaciers (formation, ablation, and its various forms, glacier streams and icebergs); physics of ice; heat in glaciers and inland ice (melting temperature, external sources of heat—namely conduction, radiation, convection, heat of the earth), internal dynamic heat sources such as pressure changes, friction and compression; heat from glaciers and inland ice; structure of ice and of glaciers; movement of glaciers and of inland ice; relationship of glaciers to the surrounding and underlying surfaces (moraines, drumlins, pluvioglacial deposits); geographical distribution of glaciers and annual and secular variations of glaciers and their meteorological causes. *Subject Headings:* **1. Glaciology 2. History of glaciology.**—*I.L.D.*

5.5–5 551.510.535

*†Goody, R. M. (*St. John's College, Cambridge*), **The physics of the stratosphere.** Cambridge, Eng., University Press, **1954.** 187 p. 60 figs., 17 tables, bibliog. p. 176–181, eqs. Price $5.00. *Cambridge Monographs on Physics.* **DLC**—A simple but up-to-date and accurate treatment of the structure, composition and energy conditions in the upper atmosphere with emphasis on experimental rather than theoretical results. The latest equipment, including rockets, is considered. The layer between that wherein "weather" plays an important role, and the ionosphere (e.g., from 12 to 80 km) is emphasized. The several chapters take up the following subjects: 1) Discovery and nomenclature of stratosphere; 2) Temperature and its measurement by sound propagation, meteor and rocket techniques; 3) Composition (H_2O, CO_2, rare gases, etc.); 4) Ozone; 5) Winds and turbulence in the stratosphere; 6) Radiation. The last chapter is especially complete and up-to-date, taking up the latest theoretical and experimental knowledge of the radiation balance in the stratosphere, the effects of various gases (H_2O, CO_2, NO and O_2) on the absorption of solar and terrestrial radiation, line shapes spectroscopy and, finally, the effect of radiation balance on tropopause temperatures and vice versa. *Subject Headings:* **1. Upper atmosphere physics 2. Textbooks.**—*M.R.*

5.5–6 551.510.535:51.590.2

†Kaiser, T. R. (*Univ. of Manchester*), **Radio echo studies of meteor ionization.** *Advances in Physics*, London, 2(8):495–544, Oct. **1953.** 25 figs., refs. p. 543–544, eqs. **DLC**—In this comprehensive review article numerous aspects of the quantitative investigation of the physical properties of the upper atmosphere by 4 to 10 m radio reflections from meteors and meteor trails are discussed theoretically and empirically, and the results of a large amount of original investigation made at Jodrell Bank, England, and never before published, incorporated therein. The theory of meteor ionization and dissipation of these ions; the theory of scattering of radio

waves from meteor trails and experimental data on this subject; the estimation of ionospheric winds from fading of echoes; recombination and attachment in meteor trails; correlation with visual meteors; theory of meteor height distribution and properties of the upper atmosphere as determined from the meteor flight distribution; determination of constants used in meteor ionization equations, theory of radio echo rate, mass distribution of incident meteors; radio echo rate as function of equipment parameters, distribution of radio echo durations, total incident flux and space density of meteors and total ionization produced by meteors constitute the subject matter of the various chapters. Numerous graphs and curves show the actual and theoretical relationships involved in all of these phases of meteor research. Comparisons are made with rocket and meteor data obtained in the U. S. and Australia. It is concluded that the incident flux of sporadic meteors is sufficient to maintain a continuous ionospheric layer from 130 down to 115 km below which ionization will be distributed in patches becoming fewer with decreasing height. *Subject Headings:* **1. Meteor ionization trails 2. Radio echo meteor soundings 3. Upper atmosphere physics 4. Ionosphere models.**—*M.R.*

5.5–7 551.510.535:551.507.362(02)

*†Newell, Homer E., Jr. (*Naval Research Laboratory, Wash., D. C.*), **High altitude rocket research.** N. Y. Academic Press, **1953.** 298 p. 93 figs., 37 tables, numerous refs. at end of each chap. Price **$7.50.** **DLC**—This is a thoroughly readable but technical book on a timely subject. The first chapter discusses the upper atmosphere in general, the use of various types of rockets in present day investigations, and a tabulation of rocket flights made from March 1946 to Dec. 1952 and the essential facts about these flights. A list of 69 references is appended. Chapter 2 takes up the rocket itself as a research tool (performance, pay load, motions, heating, and a schedule of preparations for firing). Chap. III gives results of experience in recovery of data (both by telemetering or usual means and from recovered instruments, records or photographs). Chap. IV gives theory and practice of determining pressure density and temperature in the upper atmosphere and the latest data (either measured or derived) and models obtained therefrom. Chap. V gives a brief account of sound grenade or rocket measurements of winds at great altitudes. Chap. VI is an excellent summary or description of equipment, methods and data on solar radiation obtained by rocket spectrographs. Chap. VII takes up spectrographic and photoelectric determinations of ozone and the effects of ozone on the atmospheric and solar radiation. Dissociation and diffusive separation of O_3 are important aspects discussed. Chap. VIII is on the ionosphere and the earth's magnetic field; Chap. IX on cosmic rays and their measurement, intensity, distribution with height and latitude, etc. The final chapter gives a resumé of methods and results of high altitude photography from rockets. Accuracy of equipment and methods used and possible sources of errors are emphasized throughout the book. Only published results and data have been used. A subject and author index add to the usefulness of the book. *Subject Headings:* **1. Rocket investigations 2. Upper air research 3. Rocket bibliographies 4. Textbooks.**—*M.R.*

5.5–8 551.594.22:7

†Rieth, Adolf, **Der Blitz in der bildenden Kunst.** [Lightning in plastic art.] Munich, Ernst Heimeran Verlag, **1953.** 48 p. 67 plates, 37 refs. **DWB**—This fascinating book combines a wealth of legend, history, science and art in an organized manner to trace the concept of lightning and its origin from prehistoric times to the present day, among primitive people like the Eskimos, Africans and Bushmen of Australia and among civilized people of Europe. Scores of excellent reproductions of artifacts and (from the Renaissance to 1940) paintings and photographs of lightning, storms, and associated phenomena are presented. The sources are well annotated and the text is accompanied by numerous schematic diagrams. The plates are at the end of text. *Subject Headings:* **1. Lightning in art 2. History of meteorology 3. Art.**—*M.R.*

5.5–9 551.582(768)

*U. S. Weather Bureau, **Meteorological survey of the Oak Ridge area. Final report covering the period 1948–1952.** *U. S. Atomic Energy Commission, ORO–99,* Nov. **1953.** 584 p. 181 figs., 56 tables, 107 refs. p. 25–32, eqs. **DWB**—An enormous volume presenting

accumulated data and analyses thereof, based on a survey of the meteorological and climatic conditions in the Oak Ridge, Tenn., District. The purpose and scope of the project, history, available records, etc. constitute Pt. I. Pt. II describes instrumental equipment and observational techniques—accuracy, representativeness, etc. Pt. III comprising more than 300 pages, gives the basic data in tables and many kinds of graphs, charts, etc., together with an analysis of each element: 1) pressure, 2) precipitation, 3) cloudiness, solar radiation, ceiling, visibility and state of ground, 4) temperature and humidity at ground, 5) vertical temperature gradient, 6) wind and turbulence. Pt. V gives results of atmospheric diffusion investigations. The studies of smoke trails, radioactivity traces and the effects of buildings, forests, ridges and mountain gaps are summarized. Theoretical approaches are set forth for each operation. Quantitative data is given in detail in tables and charts and equipment in illustrations. Sample records are also reproduced throughout. Four years of detailed data, such as microstructure of wind and temperature, solar radiation, etc. are supplemented by long period records (some 75 years) from nearby stations and upper air soundings of 15 years (radiosonde) to 30 years (pilot balloon) from stations in this general portion of the country. *Subject Headings:* **1. Climate of Oak Ridge, Tenn. 2. Climatic data 3. Turbulent diffusion data 4. Oak Ridge, Tenn. I. Holland, J. Z. II. Myers, R. F. III. U. S. Atomic Energy Commission.**—*M.R.*

GENERAL METEOROLOGY

5.5–10 5:016 551.5:05

†Mexico City. Centro de Documentación Científica y Técnica, **Boletín.** First issue received, v. 1, no. 1, Jan. **1952**; last issue received, v. 4, no. 3, March **1954.** Monthly. Editor, Dr. F. Priego. Price: foreign, $6.00 U. S. per vol. **DLC**—This new monthly bibliographic series fills a great need for prompt and comprehensive coverage of the world's scientific and technical literature for the benefit of Spanish speaking countries of Latin America in a manner similar to the French *Centre National de la Recherche Scientifique, Bull. Anal.* However, it is useful in other countries of the Western Hemisphere as the original language title always follows the Spanish translation of the title, and the journal citations are in the original language. The main meteorological journals are covered with a surprisingly short time lapse. The general arrangement is by subject, classified into 10 major and 100 subsections. Section C 3 entitled Geofisica and C 4, Meteorología y Fisica de la Atmósfera usually contain 100 to 150 references, some with brief annotations. Also in section J 2 are items on Agricultural Meteorology. *Subject Headings:* **1. Periodical bibliographies 2. Bibliographies 3. Spanish language 4. Mexico.**—*M.R.*

5.5–11 551.511 551.5(02)

Vialar, J., **Cours élémentaire de mécanique de l'atmosphère.** [Elementary course in mechanics of the atmosphere.] Paris, Météorologie Nationale, May **1951.** 127 p. 104 figs., eqs. **DWB**—This elementary treatment of atmospheric mechanics is aimed at beginning students in meteorology schools. Vector notation is used throughout and numerical examples are given. The individual chapters take up the following topics: the elementary physical concepts of mechanics, velocity, acceleration, force dynamics, depressions, relative motion, circular motion, coriolis force, etc.; atmospheric dynamics, including equations of motion, equation of horizontal motion of an air particle and its resolution, geostrophic and gradient wind, etc.; atmospheric movement, horizontal and vertical divergence and convergence and their role in depressions and anticyclones, confluence displacement of isobaric patterns; and the modification of pressure fields with altitude. *Subject Headings:* **1. Mechanics of the atmosphere 2. Meteorology textbooks.**—*I.L.D.*

5.5–12 55:06 551.5:06

Chapman, Sydney, **The International Geophysical Year 1957–58.** *Nature*, London, 172(4373):327–329, Aug. 22, **1953. DLC**—Summary of proposals to hold a Third International Polar Year 25 years after that of 1932–33, organization set up, and proposed activities. Main meteorological problem is general circulation, especially above the troposphere. *Subject Heading:* **1. International Geophysical Year 1957–1958.**—*C.E.P.B.*

5.5–13 551.5:06(82) 551.5:016(82)

Comentarios sobre los trabajos realizados en los anos 1948, 1949 y 1950 en la Dirección General del Servicio Meteorológica Nacional [Argentina]. [Accomplishments of the Argentine Meteorological Service, 1948–1950.] *I.U.G.G. Association of Meteorology, Brussels, 1951, Rapports Nationaux*, p. 69–76, June **1952. DWB**—Abstracts of 30 papers recently written and partly published by authors working in the Argentine Meteorological Service are presented. Most of the papers deal with weather and climate in Argentina, some with solar radiation and biometeorology. *Subject Headings:* **1. Meteorological research 2. Argentina.**—*A.A.*

5.5–14 551.5:06

Sapporo, Japan. Hokkaido Univ. Institute of Low Temperature Science, **Outline of the Institute of Low Temperature Science.** [Brochure, **1953?**] illus. **MH-BH**—Activities of the Institute since its foundation on Nov. 25, 1941 are outlined. The Institute is divided into six sections (pure physics, meteorology, biology, medicine, applied physics, oceanography) concerned with the investigation of natural phenomena taking place at low temperatures (between room temperature and −50°C). Thus, for example, the meteorological section is at present mainly engaged in adapting an electronic computer for long range forecasting operations and in studies on turbulence; the applied physics section is investigating physical properties of snow, growth of ice crystals by sublimation and the properties of atmospheric condensation nuclei. At the Institute, which is open to public use, six cold chambers (min. temp. −57°C) and other facilities are available. The Institute's regular publication is the journal "*Teion Kaguku*" (Low Temperature Science) issued in Japanese with English summaries. The monograph "Studies on fogs," published in 1953, gives results of the Institute's largest project (investigation of sea fog) in which practically all members of the establishment participated for the past three years. *Subject Headings:* **1. Low temperature research 2. Meteorological research institutes 3. Cloud physics 4. Sapporo, Japan. Hokkaido Univ. Institute of Low Temperature Science.**—*G.T.*

5.5–15 551.5:06(73)(058)

U. S. Weather Bureau, **Report of the Chief of Weather Bureau. Reprint from 40th Annual Report of the Secretary of Commerce. 1952.** 3 p. **DWB**—Activities in regular daily services and aviation weather services are reported and new programs mentioned. The new projects undertaken include establishment of a national Weather Record Center at Asheville, N. C., and of a Severe Weather Warning Unit attached to the Washington Analysis Center, as well as participation in special observational programs (Sierra Wave Project; experiments for improvement of ceiling and visibility measurement techniques; activities connected with air pollution and rainmaking). *Subject Headings:* **1. U. S. Weather Bureau 2. Annual service reports.**—*G.T.*

5.5–16 551.5:06(44)

Viaut, André, **L'activité scientifique dans le domaine de la météorologie, des services de météorologie et de physique du Globe de l'Union Française, en 1948, 1949 et 1950.** [Scientific activity in the field of meteorology, meteorological services and geophysics of the French Union, 1948, 1949, 1950.] *I.U.G.G. Association of Meteorology, Brussels, 1951, Rapports Nationaux*, p. 57–68, June **1952. DWB**—Detailed report on meteorological research conducted by the French meteorological services, the geophysical institutes of various universities, the National Institute of Agronomic Research and the Meteorological Society of France. A list of 18 journals is added. Bibliographic references can be found in the "Comptes Rendus du Comité National Français de Géodesie et Géophysique." *Subject Headings:* **1. Meteorological research 2. France.**—*A.A.*

5.5–17 551.5:061.3

Schweitzer, H., **Tagung der Deutschen Meteorologischen Gesellschaft in Berlin.** [Meeting of the German Meteorological Society in Berlin.] *Umschau*, 53(22):696, Nov. 15, **1953. DWB**—The main subject of the meeting was synoptic meteorology. LINGELBACH suggested new methods of extrapolation. MEYER emphasized importance of ground conditions for cold

air masses. Subjective forecasting methods were discussed by the Bad Kissingen group. PALMÉN spoke on jet streams. Other subjects were large-scale mass, momentum and energy exchange in long range forecasting and local synoptic studies. *Subject Heading:* **1. German Meteorological Society.**—*C.E.P.B.*

5.5–18 551.5:519.2

Aldaz, Luis, **Las operaciones combinadas y la meteorología.** [Combined operations and meteorology.] *Revista de Aeronáutica*, Madrid, No. 127:475–477, June **1951.** 2 figs. **DLC**—Presents a technique for determining the probability of occurrence of certain meteorological elements, based on the simultaneous occurrence of more basic parameters, such as gradient wind direction and speed, isobaric curvature and prevailing air mass. The Weather Division, Hq, USA AF, has used a similar technique. The determination of the probability of occurrence of certain cloudiness and precipitation conditions over Hokkaido is cited as an application of the proposed technique. *Subject Headings:* **1. Simultaneous probabilities 2. Probability forecasting.**—*R. S. Quiroz.*

5.5–19 551.5:525.3

Troeger, Heinz, **Die Beziehung zwischen der Änderung der Polhöhe und meteorologischen Elementen.** [The relation between changes of pole height and meteorological elements.] *Meteorologische Rundschau*, 6(7/8):136–137, July/Aug. **1953.** 2 figs., 3 refs. **DWB**—Relations of radius of track of pole to Jan. pressure at Astrakhan' and water temperature near Westmannö in different years are shown graphically. They form figures of eight with a range of a few seconds of arc. *Subject Headings:* **1. Meteorological effects 2. Polar orbit.**—*C.E.P.B.*

5.5–20 551.5:551.43

Geiger, Rudolf, **Probleme der Mikrometeorologie des Hochgebirges.** [Problems of micrometeorology in high mountains.] *Wetter und Leben*, 5(1/2):21–28, March **1953.** 21 refs. **DWB**—Under the concept of micrometeorology, the author includes microclimatology, the former involving primarily physical synoptic processes, the latter statistic-climatological conditions. The micrometeorology of mountain slopes is discussed with special reference to the atmosphere and relief conditions determining the local microclimatic features. The characteristics of the individual meteorological variables on mountain slopes are discussed. The literature is summarized. *Subject Headings:* **1. Micrometeorology 2. Mountain meteorology.**—*I.L.D.*

5.5–21 551.5:6

Byers, Horace R. (*Chicago Univ.*), **The new science of industrial meteorology.** *Weatherwise*, 6(2):29, 57, April **1953.** **MH-BH**—A short article outlining the development of industrial weather forecasting and advisory service which began with I. P. KRICK at Caltech. in the early 1930's and expanded after World War II. Reasons for successes and failures of private consulting meteorologists are noted. *Subject Headings:* **1. Industrial meteorology 2. Meteorological careers. I. Krick, I. P.**—*M.R.*

5.5–22 551.5:66

Collins, George F. (*Eng. Dept. E. I. du Pont de Nemours & Co.*), **Meteorology in a chemical industry.** *Weatherwise*, 6(2):34–45, April **1953.** illus. **DWB**—Meteorologists were first employed by DU PONT in 1943 in connection with the construction of the Hanford, Wash., atomic energy works. In 1948 meteorologists were employed in the Engineering Dept. and at present 7 professional meteorologists (with engineering background), assigned to the Water, Waste, and Weather Consultant Group (in the Engineering Dept.), assist in planning and operational activities of the Company. Among the many services described and illustrated are: 1) studies to help in selecting sites for plants or to determine the best location or height of stacks, 2) to design air conditioning equipment, storm sewers, foundations, etc., 3) sampling of air in vicinity of stacks during operation, 4) studies of wind or icing load on structures or power lines, 5) microclimatic studies of frost penetration and temperature conditions affecting insulation of buried pipelines, and 6) the issuing of specialized short range

forecasts for various construction and operation activities. *Subject Headings:* **1. Industrial meteorology 2. Chemical industries.**—*M.R.*

5.5–23 551.5:665

Glenn, Alfred H., **Weather and oil.** *Weatherwise*, 6(2):39, 59, April **1953. DWB**—The activities of the industrial meteorologist working in the Oil Industry are classified under the following heads: production, exploration, legal, pipeline and refinery, aviation, marketing, research and tanker operation. Although 30 distinct problems are listed, new problems are said to appear daily. The place of the consulting meteorologist in the petroleum industry is considered by the author as being an accepted service along with other technical services. *Subject Headings:* **1. Industrial meteorology 2. Oil industry.**—*M.R.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: **Radarsonde station, Crawley** (Grant), 5.5–47; **Kinetics of reaction of NO and O_2 . . .** (Lichtin), 5.5–81; **Snow data** (Smith-Johannsen), 5.5–179; **Snow survey measurements** (U. S. Soil Conservation Service), 5.5–184.

5.5–24 551.501.4:519.24

Skeib, G., **Meteorologische Anwendungen der Dimensionsanalyse.** [Meteorological applications of dimensional analysis.] *Zeitschrift für Meteorologie*, 7(3):73–77, March **1953.** 6 refs., 28 eqs. **MH-BH**—The use of dimensional analysis in meteorology is illustrated with the aid of the following examples: the height of the homogeneous atmosphere, propagation of temperature waves at the surface of the earth, psychrometric formula, extinction through the Rayleigh scattering, and Rayleigh criterion for the onset of convection. The derived dimensional formula and the processes of derivation are given. *Subject Headings:* **1. Dimensional analysis 2. Mathematical techniques.**—*I.L.D.*

5.5–25 551.501.42:551.509.312

Fetisov, K. V., **Ob opredelenii baricheskoĭ tendentsii.** [On the determination of the barometric tendency.] *Meteorologiia i Gidrologiia*, No. 7:25–28, **1952.** fig. 2 tables. **DLC**—At present many meteorological stations of Central Asia located at heights more than 500 m above sea level calculate the barometric tendency from values reduced to sea level. The author investigated numerous cases of pressure distribution over Turkistan and established that the method of pressure reduction to sea level is inadequate and calculated barometric tendency from reduced values increased the probable error. The error from unreduced values is usually less than 1 mb, but errors from reduced values can reach several millibars. *Subject Heading:* **1. Barometric tendency calculation.**—*N.T.Z.*

5.5–26 551.501.42

Myers, Vance A. (*U. S. Weather Bureau*), **A method of reducing sea-level pressure to 1000-mb height for upper-air evaluations.** *American Meteorological Society, Bulletin*, 34(4): 160–162, April **1953.** 2 tables, 2 refs. **MH-BH**—In the Extended Forecast Section of the U. S. Weather Bureau, a slide rule has been used for reducing sea level pressure to 1000 mb which was based on the assumption of a constant or fixed density for the 1000 mb to sea level pressure layer. The revised slide rule, whose derivation is presented and which is illustrated in this article, assumes that the mean vertical temperature for this layer is directly proportional to the mean vertical temperature from 1000 to 700 mb. A check of the accuracy of the revised slide rule shows greater accuracy for a wide variety of lapse rate conditions (Fairbanks, Churchill, Minneapolis, New Orleans, Phoenix and Honolulu) than with the old slide rule. The magnitude of the 700 mb pressure errors at Barrow and Honolulu are also tabulated for a number of situations. The usual error for the warm station is +10 or +20 gp ft and for the cold station +40 or +50 ft. *Subject Headings:* **1. Pressure reduction 2. Slide rules 3. Constant pressure charts.**—*M.R.*

5.5–27 551.501.42:551.508.4

Sneyers, R., **La mesure de la pression atmosphérique.** [Measurement of atmospheric pressure.] *Ciel et Terre*, 69(3/4):82–92, March/April **1953.** 3 figs., 2 tables, 7 refs. Also in: *Belgium, Institut Royal Météorologique de Belgique, Contributions*, No. 8, **1953. DWB, MH-BH**—The purpose of this note is to assist amateur meteorologists in their often confusing task of adjusting an aneroid barometer. The author takes advantage of this opportunity to summarize the history of atmospheric pressure measurement and also suggests an easy and inexpensive way of constructing a mercury barometer having adequate sensitivity for indicating atmospheric pressure variations. In a final section, atmospheric pressure reduction at a given level is explained. *Subject Headings:* **1. Pressure measurement 2. Aneroid barometers 3. Mercurial barometers 4. Barometer corrections 5. Pressure reduction.**—*Trans. of author's abstract.*

5.5–28 551.501.42:551.508.71

Sonntag, D., **Neue graphische Aspirations-Psychrometer-Tafeln.** [New graphical aspiration psychrometer charts.] *Meteorologische Rundschau*, 5(9/10):182–184, Sept./Oct. **1952.** 3 figs., 3 charts, 5 refs., eqs. **DWB**—Charts are described and illustrated for reading off relative humidity, vapor pressure (mm) and dew point from dry bulb and dry-wet temperatures, for wet bulb above and below 0°C; another gives corrections for atmospheric pressure (mountain stations). *Subject Heading:* **1. Psychrometric charts.**—*C.E.P.B.*

5.5–29 551.501.7:001

Baur, Franz, **Fallbeschleunigung, Geopotential, geopotentielles Meter, reduziertes Geopotential.** [Downward acceleration, geopotential, geopotential meter, reduced geopotential.] *Zeitschrift für Meteorologie*, 7(1):27–28, Jan. **1953.** 3 eqs. **MH-BH**—Criticizes use of dynamic and also of geopotential meter, which are both geopotential units, but not lengths. Proposes to use the name Bjerk for the geopotential $H=\int_0^z gdz\ [m^2s^{-2}]$ and to introduce the reduced potential difference $H_{rd}'=\frac{1}{gn}\int_{z_1}^{z_2} gdz\ [m]$, which has the dimensions of a length (gn—normal downward acceleration). *Subject Headings:* **1. Geopotential 2. Definitions.**—*A.A.*

5.5–30 551.501.7

Bucsy, József, **A függöleges metszetek szerkesztésének módszere és felhaszmaálásuk a cirkuláció számításánál.** [Construction of vertical cross sections and their use in circulation computations.] *Időjárás*, 56(1/4):3–21, Jan./April **1952.** 10 figs., 2 tables, 18 eqs. Russian and French summaries p. 121. **DLC**—Vertical cross sections for two lines intersecting at Budapest (Aldergrove—Bucharest and Cagliari—Moscow) are being drawn up regularly in the Hungarian Aerological Service on the basis of reports received from 25 Hungarian and other European stations. The cross sections indicate temperature, equipotential temperature, relative humidity and specific humidity. The author discusses general principles and several details of the theory of vertical cross sections. He gives a mathematical analysis of the application of vertical cross sections to Bjerknes' circulation theorem. *Subject Headings:* **1. Aerological cross sections 2. Circulation patterns.**—*G.T.*

5.5–31 551.501.7:551.573

Genève, R., **Méthode de mesure de l'évaporation à l'aïde de radiosondages.** [Method of measurement of evaporation by means of radiosondes.] *Journal Scientifique de la Météorologie*, 4(15):110–111, July/Sept. **1952.** 3 figs., 3 refs. English and Spanish summaries p. 110. **DWB**—Simple method of measuring evaporation proposed, based on the comparison of two aerological soundings, located on the same trajectory. Example discussed with two ship stations over the North Atlantic lying 1100 km apart. *Subject Headings:* **1. Evaporation measurement 2. Radiosondes 3. North Atlantic.**—*A.A.*

5.5–32 551.501.7:551.551:551.557

James, D. G., **An account of one of the methods employed in the investigation of clear air turbulence.** *Great Britain. Meteorological Research Committee, M.R.P.*, 792, March 26

1953. 8 p. fig., 5 tables, 3 refs. Mimeo. **GB-MO**—Trial aircraft observations with ultra-rapid instruments were made on May 22, 1952 in clear air at 9000–11,000 ft to measure mean temperature and wind and small scale fluctuations, and frost point. Paths of smoke puffs from the aircraft were traced by camera obscura on the ground. The method of analyzing the observations is set out. The apparatus proved suitable for measuring turbulence parameters in the free atmosphere. *Subject Headings:* **1. Upper air research 2. High level turbulence.**—*C.E.P.B.*

5.5–33 551.501.81:551.515.41

Wexler, Raymond, **Radar echoes from a growing thunderstorm.** *Journal of Meteorology*, 10(4):285–290, Aug. **1953.** 3 figs., 5 tables, 13 refs., 4 eqs. **MH-BH**—A theoretical expression is obtained for rate of growth of an ice sphere. Hail trajectories in various updrafts are computed. Minimum hail diameters, of various concentrations, detectable by radar at 25 km, and temperature of first radar echo with various updrafts are calculated. Four conclusions about behavior of radar echo are set out. With an updraft of 3 m/s first echo occurs at −8 to −11°C. This and subsequent extension of the echo are in good agreement with the observations of E. J. Workman and S. E. Reynolds (1949) in New Mexico. *Subject Headings:* **1. Radar echoes 2. Thunderstorm dynamics.**—*C.E.P.B.*

OBSERVATIONAL DATA

See also: **Complex expedition for study of atmos. turbulence** (Gandin, Dubov), 5.5–140.

5.5–34 551.506.1(437)(058)

*Czechoslovakia. Štátní Meteorolický Ústav v Praze [and] v Bratislave, **Ročenka povětrnostních pozorování 1947.** [Yearbook of meteorological observations, 1947.] Prague, Pub. by the Institutes, **1949.** 275 p. all tables. In French, Czech and Slovak. *Czechoslovakia. Statní Meteorologický Ústav v. Praze [and] v. Bratislava, Publikace Rada* B, v. 32, **1947. DLC**—The yearbook contains a list of meteorological stations in operation during 1947 with coordinates and names of observers. Complete data for different meteorological elements are given daily for 14 stations, and monthly for all stations. For numerous stations daily and monthly records of sunshine duration are also presented. Monthly mean and extreme air temperatures observed at hydrological stations are presented in a separate table as well as a table of five-day means of air temperature for all stations of the country. *Subject Headings:* **1. Climatic data 2. Observational data 3. Annual meteorological reports 4. Czechoslovakia.**—*N.T.Z.*

5.5–35 551.506.1(497.1)

*Split, Yugoslavia. Hidrometeoroloski Opservatorij "Marjan," **Godisnji Izvjestaj.** [Yearly-Bulletin.] Vol. 1, **1945,** publ. 1946; last issue received Vol. 4, **1948.** publ. 1953. At head of t-p: Hidrometeoroloska Služba N. R. Hrvatske-Pomorski Odjel. In Croatian (v. 4, 1948 has t-p. and introd. in English also). mostly tables. **DWB, DLC** (Slavic R.R.)—The Split Observatory is located at the top of Mt. Marjan, altitude 125.5 m above s.l. It was founded in 1926, was interrupted during the war and reestablished in Nov. 1944. Many of the instruments were destroyed. Daily (in many cases thrice daily) values of all standard meteorological elements are given by months and summary of mean and extreme values of pressure, temperature, relative humidity, cloudiness, wind speed, precipitation, sunshine, hydrometeors, wind direction frequencies, etc. are given for each month and for the year. *Subject Headings:* **1. Annual meteorological reports 2. Climatic data 3. Split, Yugoslavia.**—*M.R.*

5.5–36 551.506.5(988)

*Fristrup, B., **Climate and glaciology of Peary Land, North Greenland.** *I.U.G.G. International Association of Scientific Hydrology, Brussels, 1951, Transactions,* 1:185–193, **1952.** 5 figs., table, 5 refs. **DWB**—Study based on investigations, carried out during the Danish Peary Land Expedition 1947–50. Monthly means given for air pressure, mean and extreme temperatures, wind speed, glacial accumulation and ablation. Average temperature of Jan.

−30°C, of July 6.1°C; 70 frost free days. Low humidity, little precipitation and strong wind erosion characterize the Arctic desert. *Subject Headings:* **1. Danish Peary Land Expedition 2. Arctic expeditions 3. Expeditionary climatic data 4. Arctic deserts 5. Peary Land, Greenland.**—*A.A.*

5.5–37 551.506.5(98)

Silk, George, **North Pole, 103 miles, temperature 60 below.** *Life*, Chicago, 32(13):13–17, March 31, **1952.** illus. **DWB**—Popular, illustrated account of U. S. Air Force landing and take-off, on 9-mile long ice island between Greenland and the Pole, on March 19, 1952. Three men were left on the island, at −60°F temperature, to take observations. Plane returned to Canadian Archipelago Weather Station, and eventually to Greenland base. Ice island has been named T-3. *Subject Headings:* **1. Arctic Ice Island T-3 2. Arctic observations 3. Arctic aviation 4. Fletcher's Ice Island (T-3), Arctic Ocean 5. Canadian Arctic.**—*M.R.*

5.5–38 551.506.7

du Chaxel, R., **Quelques sondages par avion remarquables.** [Remarkable airplane soundings.] *Journal Scientifique de la Météorologie*, 4(15):99–109, July/Sept. **1952.** 6 figs., 2 tables. English and Spanish summaries p. 99. **DWB**—Usual meteorological soundings give only a rough idea of the state of the free atmosphere. Author shows by six samples, how carefully corrected aircraft soundings can reveal remarkable inversions, variations in humidity or cloud strata. *Subject Headings:* **1. Airplane soundings 2. Inversions 3. Humidity variations 4. Cloud observations from airplane.**—*A.A.*

5.5–39 551.506.7:551.507.362:551.507.321

Vaeth, J. Gordon (*U. S. Office of Naval Research*), **Rockets in the Arctic.** *Flying*, New York, 52(4):16–17, 53, April **1953.** photos. **DWB**—Flights to 40 miles height were made over Baffin Bay in the summer of 1952, by launching "Deacon" rockets from "Skyhook" balloons, which in turn were launched from the deck of a naval vessel steaming along with the wind at the speed of the wind. The purpose of these soundings was to determine cosmic ray intensities over the Arctic. Hitherto flights to such high altitudes have been made only with the elaborate, costly V-2, WAC corporal or aerobee rockets. This introduces possibilities of simultaneous meteorological soundings from a network of stations at no more cost than one sounding with a big rocket. *Subject Headings:* **1. Rocket soundings from balloons 2. Cosmic ray soundings 3. Skyhook balloons 4. "Deacon" rockets 5. Baffin Bay, Canada 6. Canadian Arctic.**—*M.R.*

INSTRUMENT CARRIERS

See: **High altitude rocket research** (Howell), 5.5–7; **Rockets in Arctic** (Vaeth), 5.5–39; **Met. equipment for microwave propagation studies** (Georgia Inst. of Tech.), 5.5–43.

INSTRUMENTS

See also: **Atmos. pressure measurement** (Sneyers), 5.5–27; **Graphical aspiration psychrometer charts** (Sonntag), 5.5–28; **Wind gust velocity determination by accelerometer records** (Dubov), 5.5–136; **Measurement of spectral scattering function of air near ground by good visibility, smoke and fog** (Foitzik, Zschaeek), 5.5–228; **Small ion balance over ocean** (Hess, Parkinson), 5.5–238.

5.5–40 551.508.79

Pauthenier, Marcel; Brun, Edmond and Demon, Lucien, **A propos d'une note récente sur l'analyse des brouillards.** [A recent note on the analysis of fog.] *Académie des Sciences, Paris, Comptes Rendus*, 236(10):1067–1068, March 9, **1953.** refs. **DWB**—Two methods of capturing and measuring fog or cloud droplets are described. Both are based on coronal or electrostatic precipitation of the drops (1) on a record sheet sensitized with methaline blue, to count the number of drops per unit volume, or by means of a non-wettable paper covered with smoke (as used at M.I.T.) to measure number and the size of drops, and (2) in an oil which allows the drops to be measured under a microscope, or by collecting the drops on a

network of plexiglass wires, which is limited by the time that it takes for the droplets to coalesce with wire. *Subject Headings:* **1. Fog drop counters 2. Drop size measurement 3. Electrostatic precipitators.**—*M.R.*

5.5–41 551.508.8(02)

U. S. Air Weather Service, **Weather equipment technician.** *U. S. Air Weather Service, Training Guide,* 50-6, Dec. **1951.** 50 p. **DWB**—A detailed schedule for a 100-day training program (equivalent to approximately 4 years' training in reserve units) is offered as a guide to detachment commanders conducting training or refresher courses for weather equipment technicians. The course comprises four phases: 1) Theoretical fundamental knowledge; 2) Rawisonde, radiosonde, radio direction finder, rawin set, radio wing equipment; 3) Ceilometer, radar storm detection equipment, power equipment; 4) Sferics. Subject and method of instruction and references are indicated on the daily schedules. *Subject Headings:* **1. Instrument technology 2. Instrument maintenance 3. Training manuals.**—*G.T.*

5.5–42 551.508.8:551.509.34

Wood, Louvan E., **Meteorological apparatus.** U. S. Patent 2,587,946. March 4, **1952.** Filed Oct. 17, 1946 [under] Serial No. 703,918. 6 columns. diagrs. **DP**—A meteorological device automatically providing local weather indications by measuring and computing atmospheric pressure and specific humidity is described in detail and represented on two schematic diagrams. The apparatus provides for elimination of temperature-induced relative humidity changes and for a compensation of seasonal changes in specific humidity. The patent was assigned by the inventor to Bendix Aviation Corporation. A note announcing the patent was issued in *Science News Letter,* 61(12):190, March 22, 1952. *Subject Headings:* **1. Local forecasting 2. Mechanical weather forecasters 3. Patents.**—*G.T.*

5.5–43 551.508.82:551.507.321.4:535.2

Georgia Institute of Technology. State Engineering Experiment Station, Atlanta. **Meteorological equipment for microwave propagation studies.** Contract No. W28-099-ac-175, Project No. 109-8, Technical Report No. 3, Oct. 31, **1950.** 29 p. 12 figs. **DWB**—A camera meteorograph for captive balloon soundings, and a portable weather station for surface observations are described briefly and illustrated in detail (photographs and wiring diagrams). A 100 ft meteorological tower, and aircraft soundings to 5,000 ft for microwave propagation studies in the surface layers of the atmosphere are also described. *Subject Headings:* **1. Captive balloons 2. Meteorographs 3. Portable weather stations 4. Microwave propagation studies. I. Widerquist, C. Y. II. Stringer, F. D. III. Contract W28-099-ac-175, Project No. 109–8.**—*M.R.*

5.5–44 551.508.822

*Ackermann, Paul, **Radiosondierungen in Gruyère (Kt. Freiburg) und Lutry bei Lausanne.** [Radiosonde tests at Gruyère . . . Lausanne.] *Switzerland. Meteorologische Zentralanstalt, Annalen,* Vol. 88, **1951.** 3 p. appended to Anhang No. 6, publ. 1952. 6 figs. **DWB**—Comparative radio soundings were made for the same type of radiosonde at Gruyère and Payerne on Feb. 27 and between Lutry près Lausanne and Payerne on Feb. 28, 1952. The three stations are, respectively, located on a plateau, in an alpine valley and on the edge of a lake. However, the differences were so small as to be within the instrumental tolerance. Meteorological situations on the 2 days are described. The largest differences in temperature (−2°C at 540 mb to +2°C at 350 mb) and humidity (10–20%) can be explained on the basis of relief (very rugged) and local weather (inversions, fog, etc.). The fact that the radiosondes do not go up vertically but traverse high Alps in the course of these soundings is taken into account. *Subject Headings:* **1. Radiosonde comparisons 2. Payerne, Switzerland.**—*M.R.*

5.5–45 551.508.822

Armour Research Foundation, Chicago, **Investigations of use of crystals as meteorologic elements for measurements of temperature, pressure and humidity.** Contract W-36-039-sc-36852, Project No. 90-621A [later 90-621E], Reports [later Quarterly Reports], No. 1–5, 8, Sept. 8, Dec. 20, **1948;** March 8, June 8, Sept. 13, **1949;** June 19, **1950.** diagrs., tables,

graphs. **DWB**—Project is to determine feasibility of employing the piezo-electric effect to measure temperature, pressure and humidity in the atmosphere for use in radiosondes. In the last report, the work done in calculation of errors in temperature measurement produced by solar radiation, and laboratory tests on quartz crystal sensing elements, is described. Earlier reports give more details of the tests and illustrate equipment, etc. Errors may be several degrees centigrade unless well ventilated (in which case accuracies within 1°C can be obtained at air speeds of 10 ft/sec). Frequency changes produced by bending a quartz plate, and effects of pressure and temperature on dissipation of crystals, use of crystals for humidity measurements, dew point circuits, and, finally, advantages of silver iodide coating of the crystal are treated. *Subject Headings:* **1. Piezo-electric effect 2. Quartz crystal sensing elements 3. Radiosonde elements 4. Instrumental errors. I. Tyson, J. K. II. Contract W-36-039-sc-36852.**—*M.R.*

5.5–46 551.508.822(02)

Bendix Aviation Corporation. Friez Instrument Div., **Instruction book for radiosonde receptor AN/FMQ-2A.** Contract NOas 53-268 [Report]. *U. S. Navy. Bureau of Aeronautics, NAVAER* 16-30FMQ2-501, July 7, **1952.** 8 sections, each renumbered. Numerous illus. (many fold.) *U. S. Navy. Bureau of Ships, NAVSHIPS* 91667, July **1952. DWB**—This instruction book gives complete information on installation, operation, adjustment, alignment, calibration and maintenance of the AN/FMQ-2A radiosonde (frequency range 390–410 Mc) designed for the use aboard ship and/or at naval shore stations. It may also be used for the AN/FMQ-2 radiosonde originally converted from RAU or AN/FMQ-1 type equipment. The text is divided into the following sections: general description, theory of operation, installation, operation, operator's maintenance, preventive maintenance, corrective maintenance and parts list. Elaborate diagrams and illustrations. *Subject Headings:* **1. Radiosondes 2. Manuals. I. Contract NOas 53-268.**—*W.N.*

5.5–47 551.501.8:551.508.822

Grant, D. R., **Radar-sonde station at Crawley.** *Meteorological Mazagine*, London, 82(978):353–357, Dec. **1953.** 4 photos, table, ref. **MH-BH**—A radarsonde developed by Mullard, Ltd. and Radar Research Establishment is described. It is designed to measure winds at greater ranges and more accurately than present system, by using an air-borne transponder in place of radar reflector. There are pressure and temperature aneroid capsules and a humidity unit (goldbeaters skin), motor-driven switch and high-precision pulse delay circuit. Expected standard errors, pressure 1 mb, temperature 0.2°C (solar radiation effect 0.4–1.6°C), wind vector 1–2 knot. *Subject Headings:* **1. Radarsondes 2. Crawley, England.**—*C.E.P.B.*

5.5–48 551.508.822

Ishiguro, Shizuo, **A new d-c voltage converting system for power supply of radiosonde transmitter.** *Oceanography and Meteorology*, Nagasaki, 5(1/2):16–32, June **1951.** 36 figs., 6 tables, 22 refs. In Japanese; English summary p. 31–32. **DWB**—A new converting system was developed by the author. It consists of electrical contact elements, condenser, and dividing element, thus eliminating the bulky construction of dry battery power supply. The equipment and its operation are described in detail and illustrated by circuit diagrams and schematic drawings. *Subject Heading:* **1. Radiosonde transmitters.**—*G.T.*

5.5–49 551.508.822

Isono, K. and Hayashi, E., **An automatic recorder for radiosonde.** *Tateno, Japan. Aerological Observatory, Journal*, 5(1):93–94, March **1951. DWB**—Abstract of report on meeting dealing with the code sending type and the frequency modulation type of radiosonde. *Subject Heading:* **1. Radiosonde recorders.**—*A.A.*

5.5–50 551.508.822

Muirhead & Co., Ltd., **The radio sonde and weather forecasting.** *Muirhead Technique*, Beckenham, Eng., 7(2):14, April **1953.** illus. **DWB**—The radiosonde used at 16 British stations at home and overseas and at two ocean weather ships, is briefly described. It consists of an airborne unit (transmitting pressure, temperature and humidity data obtained by an

neroid capsule, a bimetallic strip and a piece of goldbeater's skin, respectively) and a ground tation whose variable oscillator was developed by Muirhead and Co. A photograph of the round equipment is presented. *Subject Heading:* **1. Radiosondes.**—*G.T.*

5.5–51 551.508.822

*Rossi, Veikko, **On the accuracy of the Finnish radiosonde.** *Geophysica*, Helsinki, 4(2): 3–78, **1953.** 7 tables, 14 refs. **DWB**—A systematic study based on tests made by successive calibrations, twin soundings and measurements with three theodolites, giving results for different time lags between calibration, day and night soundings, etc. The standard deviation (σ) of temperature errors lies between 0.5 and 0.8°C increasing with height (Z), for pressure is 5–3 mb decreasing with Z, σ for heights of pressure levels, increases up to 35 gpm at 100 mb. The barometer of the Finnish radiosonde is free from systematic errors. *Subject Headings:* **1. Radiosonde comparisons 2. Väisälä radiosonde.**—*A.A.*

5.5–52 551.508.824

Automatska meteorološka stanica. [Automatic weather station.] *Split, Yugoslavia. Hidrografski Institut Mornarice. Meteorološki Otsjek, Vremenske Prilike*, 2(1/2):45–46, July **1948.** photo. **DWB**—Brief account of the operation of an automatic weather station located at 4500 m.a.s.l. in the Pamirs of Tadzhik S.S.R. The station transmits data four times daily, switching on a radio transmitter at predetermined intervals. The transmitted data are on wind direction and velocity (winds usually have gale force), atmospheric pressure and temperature. The unit is powered by batteries. Automatic equipment of this type—it is stated —is now widely used in inaccessible locations throughout the U.S.S.R. *Subject Headings:* **1. Automatic weather stations 2. Pamirs, U.S.S.R.**—*G.T.*

5.5–53 551.508.824

Kőrösi, György, **Ejtőernyővel ledobható önműködő időjelző állomás.** [Air-launched automatic weather station.] *Időjárás*, 56(9/10):310, Sept./Oct. **1952.** 2 photos. **DLC**—Brief note describing an apparatus of unidentified manufacture. The instrument is parachuted from aircraft. Through a 7-meter antenna rod it transmits over a range of 150 km temperature, humidity and pressure data during 15 days at predetermined intervals controlled by an electric clockwork. The power is supplied by electric batteries. Photographs showing the station in two positions (reaching the ground and operating) are presented. *Subject Heading:* **1. Automatic weather stations.**—*G.T.*

5.5–54 551.508.824

Plötze, Ernst; Rawer, Karl and Stoebe, Edwin, **Langfristige, automatische Wetterfunkgeräte für grosse Übertragungsentfernungen.** [Long period automatic weather radio transmitter for great distances.] *Zeitschrift für angewandte Physik*, 5(9):351–359, **1953.** 10 figs., table, 15 refs. **DLC**—Automatic stations can provide at small cost synoptic data several times a day from remote districts. The measuring and transmitting elements of various types are illustrated. For sea areas a floating cylinder can be anchored in depths up to 2000 m. Land instruments are similar but more accurate and incorporate additional instruments including anemometer. Experiences in installing apparatus and some results are described. *Subject Heading:* **1. Automatic weather stations.**—*C.E.P.B.*

5.5–55 551.508.85.822:551.557

Gupta, B. K. and Venkiteshwaran, S. P., **A method of using the Radar AA No. 3 MK III to track the F-type radio-meteorograph to obtain both radiosonde and upper wind data.** *Indian Journal of Meteorology and Geophysics*, 4(2):164–170, April **1953.** 5 figs., 3 refs. **MH-BH**—The paper describes a method of adapting the radar AA No. 3 MK III operating on 204 mcs to track F-type radiosonde signallers on this frequency and thus obtain in addition to radiosonde data, information about upper winds also at levels higher than it is possible with radar tracking a dipole passive target. Details of construction of the 204 mc signaller and the radiosonde recording equipment are briefly described. The advantages of this type of adaptation in meteorological technique are indicated. *Subject Headings:* **1. Radarsondes 2. Radiosondes.**—*Authors' abstract.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: **Determination of barometric tendency** (Fetisov), 5.5–25; **Met. apparatus** (Wood), 5.5–42; **Halo observations, 1920–47** (Chernov), 5.5–230.

5.5–56 551.509.33

Engler, Joachim, **Grundbemerkungen zur Methodik der Mittel- und Langfristvorhersage.** [Remarks on methods of extended forecasting.] *Annalen der Meteorologie*, 5(7/12):242–247, **1952.** 4 refs. **MH-BH**—Daily forecasting methods are not applicable to extended forecasting. Author discusses use of periodic phenomena, singularities and similar rhythms, and correlation. He considers that lack of useful results may be because developments of weather are not commensurate with the calendar year. *Subject Heading:* **1. Extended forecasting.**—*C.E.P.B.*

5.5–57 551.509.33:551.553.21(09)

Normand, Sir Charles, **Monsoon seasonal forecasting.** *Royal Meteorological Society, Quarterly Journal*, 79(342):463–473, Oct. **1953.** 2 figs., photo, 4 tables. **DWB**—This Presidential Address summarizes history of forecasting monsoon rains in India since H. F. Blanford's first trial in 1878 based on Himalayan snowfall. After Sir John Eliot's analogy methods, Sir Gilbert Walker introduced empirical correlation of seasonal rainfall in different parts of India with meteorological elements over a wide area. This led to the conception of the Southern Oscillation, "a systematic swaying of inter-connected world conditions, which is intensified or checked by solar changes." The success of the forecasts is assessed as on the whole significant. *Subject Headings:* **1. Monsoon forecasting 2. History of forecasting.**—*C.E.P.B.*

5.5–58 551.509.33(08)

*Riehl, Herbert; La Seur, N. E. and others, (*Univ. of Chicago*), **Forecasting in middle latitudes.** *Meteorological Monographs*, 1(5), June **1952.** 80 p. 53 figs., tables, 78 refs., eqs. **DWB**—Theoretical as well as practical prediction methods for periods from one to three days are summarized. The prognostic chart method is considered as the most valid technique. The use of the "index cycle" of the evolution of hemispheric weather patterns and of long wave calculations for the upper air prognosis is explained. The central problem of the surface prognosis is the formation and deepening of cyclones. The analysis of the vorticity field, the steering principle and the routine construction of surface prognostic charts is discussed. Suggestions for the forecasting of temperature, precipitation, ice storms and blizzards are given and a field example presented. *Subject Headings:* **1. Extended forecasting 2. Long wave analysis 3. Symposia 4. United States. I. Badner, J. II. Hovde, J. E. III. Means, L. L. IV. Palmer, W. C. V. Schroeder, M. J. VI. Snellman, L. W.**—*A.A.*

5.5–59 551.311.18:551.509.33

Schell, Irving I., **Foreshadowing the severity of the iceberg season off Newfoundland.** *Royal Meteorological Society, Quarterly Journal*, 78(336):271–273, April **1952.** 2 tables, 3 refs. **DWB**—Revised correlation coefficients are given between iceberg count off Newfoundland and preceding pressure differences and temperatures, leading to a new regression equation with multiple correlation 0.80. *Subject Headings:* **1. Iceberg forecasting 2. Newfoundland.**—*C.E.P.B.*

5.5–60 551.509.34:551.575(54)

§Basu, S. C. (*Regional Met. Center, Calcutta*), **Fog forecasting over Calcutta and neighborhood.** *Indian Journal of Meteorology and Geophysics*, 3(4):281–289, Oct. **1952.** 9 figs., table, 2 refs. **DWB**—Synoptic situations, leading to morning fogs on the Dum Dum airport at Calcutta, studied and the effect of temperature and wind on the formation of fog discussed. Fog prediction diagram proposed (dew point depression vs. temperature), based on observations at 2200 IST. Earlier hours do not give good results. *Subject Headings:* **1. Fog forecasting 2. Airports 3. Calcutta, India.**—*A.A.*

5.5–61 551.509.3

Bruce, J. P. and Johnstone, C. L. (*Met. Div. Canada*), **A study of local weather conditions at St. Hubert Airport.** *Canada. Meteorological Div., Circular*, 2048, Tec. 105, Dec. 14, **1951.**

Local Forecast Study, No. 13. 15 p. 2 figs. **DWB**—Brief description of wind, weather and ceilings, visibility and smoke, as observed from Jan. 1950 to March 1951. No data. Local peculiarities between Darval and St. Hubert Airports are compared. *Subject Headings:* **1. Aeronautical meteorology 2. Airports 3. Local forecast studies 4. St. Hubert Airport, Quebec Province, Canada.**—*A.A.*

5.5–62 551.509.34

Coose, Vernon F. (*U. S. Air Force, Bergstrom Field*), **Study of local forecasting, Bergstrom Field, Austin, Texas.** Jan. **1951.** 12 p. 6 figs., graph, 8 refs. Mimeo. **DWB**—A description of the vicinity around Bergstrom Field (6.5 mi S.E. from Austin, Texas), the effect of local smoke sources, frontal weather development of cyclones, forecasting stratus, thunderstorms, etc. Sample synoptic and isentropic analysis charts for the Mississippi Basin region, type maps for the West which produce certain situations in Texas, objective tables and diagrams for predicting various parameters, and nomograms are included. *Subject Headings:* **1. Local forecast studies 2. Objective forecasting 3. Austin, Texas.**—*M.R.*

5.5–63 551.509.34:551.524.36

Parry, T. H., **Night cooling under clear skies at Shawbury.** *Meteorological Magazine*, London, 82(978):368–371, Dec. **1953.** 3 figs., 2 refs. **DWB**—The discontinuity in the rate of cooling found by W. E. SAUNDERS (*see item* 4.2–60, Feb. 1953, *MAB*) at Northolt is examined at Shawbury. Temperature at discontinuity given by: $\frac{1}{2}(T_{max}+T_d)-2.5°F$ (no inversion) or $-3.4°F$ (inversion at or below 900 mb.), T_d=dew point at time of max. temperature. Time of discontinuity varies from 18 h in winter to 22½ h in early summer. Subsequent cooling to minimum is also shown and discussed in relation to gradient winds. *Subject Headings:* **1. Minimum temperature forecasting 2. Single station forecasting.**—*C.E.P.B.*

5.5–64 551.509.5

Crossley, A. F., **Measures of success in forecasting. Parts I and II.** *Meteorological Magazine*, London, 83(981, 983):66–73, 139–143, March; May **1954.** Also Pt. I in: *Great Britain. Meteorological Research Committee, M.R.P.*, 788, March 24, **1953.** 12 p. 13 tables, refs., 12 eqs. Mimeo. **DWB**—1) The paper deals first with forecasts of one of two alternative events ("black or white"), both with some persistence. If c, c' are forecast accuracies of these events, $I=\frac{1}{2}(c+c')$ and I_0 is value of I obtained by forecasting persistence, criterion of success is $(I-I_0)/(1-I_0)$. Examples of meteorological forecasts are assessed on this basis. C. H. B. PRIESTLEY's index (1945) of success in forecasting continuously varying elements is also applied to forecasts of upper winds and equivalent head winds. 2) Discusses the index $P=(1-\epsilon^2/\sigma_1^2)^{\frac{1}{2}}$ where ϵ is standard error of forecasts and σ_1 is root-mean-square of variation between values of element initially and after time t. Examples are given of forecasting pressure levels and upper winds. *Subject Heading:* **1. Forecast verification.**—*C.E.P.B.*

5.5–65 551.509.5

Faust, Heinrich, **Untersuchungen über Vorhersagekarte und Vorhersage.** [Investigations on forecasting charts and forecasts.] *Meteorologische Rundschau*, 6(5/6):82–85, May/June, **1953.** 2 figs. **DWB**—Daily prebaratics and forecasts at Bad Kissingen, 1951–1952, were checked for each general weather type and frequencies of different causes of error tabulated. Most frequent errors were in estimation of lability and motion of fronts. *Subject Heading:* **1. Forecast verification.**—*C.E.P.B.*

5.5–66 551.509.5:551.515.3

Fawbush, Ernest J. and Miller, Robert C. (*Tinker Air Force Base, Okla.*), **Forecasting tornadoes.** *Air University Quarterly Review*, 6(1):108–117, Spring **1953.** 12 figs.—The seasonal frequency of tornadoes in the eastern U. S. is shown on 6 charts and the annual frequency on a 7th. Conditions required to generate tornadoes, features of a mean tornado sounding based on 75 cases, and detailed procedures for the analyst to use in determining potential instability; examples of surface, isotach, 700 mb and 500/800 mb combined charts; example of a composite chart showing maximum potential instability (using Showalter's Stability Index, etc.) and finally, 5 conditions which are considered necessary for destructive thunderstorm occurrences are presented. *Subject Headings:* **1. Tornado forecasting 2. Storm warnings 3. Showalter's Stability Index 4. Tornado frequencies 5. Eastern United States.**—*M.R.*

5.5–67 551.509.5:551.515.3

Fawbush, Ernest J. and Miller, Robert C., **The tornado situation of 17 March 1951.** *American Meteorological Society, Bulletin*, 34(4):139–145, April **1953.** 11 figs., 4 refs. **MH–BH**—Conditions which the author considers important (if not necessary) for tornado development are enumerated. These are: 1) deep layer of dry air (<50% R.H.) aloft; 2) a low layer of moist air with a high mixing ratio compared to the dry layer above; 3) a wind maximum between 10 and 20 thousand feet (>35 knots) and making a large angle with the axis or edge of the moist tongue (most severe storms occur 50 to 150 miles S of this core); 4) a low level of free convection, and 5) a strong impulse such as a cold front or prefrontal line squall to initiate the storm. The conditions which prevailed early March 17, 1951 in Texas-Oklahoma and Lower Mississippi Valley, in all of the above respects, are described and illustrated by charts and diagrams, and verification shown on chart. *Subject Headings:* **1. Tornado forecasting 2. Tornado formation 3. Synoptic conditions for tornadoes 4. Arkansas.**—*M.R.*

5.5–68 551.509.5

†§Moyer, Vance E.; Van der Hoven, Isaac and Jones, David L., **Investigation of the optimum analytical techniques for weather analysis and forecasting.** Pennsylvania. State College. Mineral Industries Experiment Station. Div. of Meteorology, Contract N189s-86996, Final Report, June 30, **1953.** 182 p. 48 figs., 22 tables, 31 refs. **DWB**—Detailed test of forecast efficiency for one winter and one summer weather situation with a total of 20 maps, systematically withholding from the different analysts certain combinations of sea level or 500 mb data. The simultaneous presentation of pressure and winds did improve forecasts significantly. Pressure was easiest to forecast, sky conditions most difficult. The reduction of information affected the forecasts of low clouds and pressure, while wind speeds were least sensitive. Forecasts generally surpassed those of persistence or trend over land, but over the ocean areas pure persistence forecasts were better. The largest forecast errors occurred in the Newfoundland region. A small sacrifice in forecast quality leads to a considerable saving in time if an optimum scheme, described in detail, is adopted. The numerical test results are presented in numerous tables and the verification procedure is analyzed. The bibliography contains mainly items on the verification of forecasts. *Subject Headings:* **1. Forecast verification 2. Synoptic analysis 3. Efficiency tests 4. United States. I. Contract N189s-86996 II. Pennsylvania. State College. Mineral Industries Experiment Station. Div. of Meteorology III. Neuberger, H.**—*A.A.*

5.5–69 551.509.58:632.9:633.491

Large, E. C., **Potato blight forecasting investigation in England and Wales, 1950–52.** *Plant Pathology*, Harpenden, 2(1):1–15, March **1953.** 7 figs., 8 refs. **DA**—Account of the application of the "Beaumont temperature-humidity rule" (temperature not less that 50°F and R.H. not below 75% for at least 48 hours) in England and Wales. Progress of blight in 1950, 1951 and 1952 is charted and validity of synoptic weather stations as forecasting centers analyzed. It is found that an "operations chart" method taking account both of meteorological warnings and first outbreaks is very reliable, especially in July and August. Bearing of cumulative rainfall on outbreaks is not yet clear. *Subject Headings:* **1. Potato blight forecasting 2. Wales 3. England.**—*C.E.P.B.*

5.5–70 551.509.59:632.4:633.491

§Bourke, P. M. Austing, **The potato blight weather warning service in Ireland in 1952.** *Eire. Meteorological Service, Technical Note*, No. 13, Jan. **1953.** 45 p. 33 charts, tables. Mimeo. **DA**—Describes periodic radio warnings of weather favorable to onset and spread of *Phytophthora infestans* (12 hrs with temperature 50°F+ and humidity 90%+, followed by free moisture or high humidity for further 4 hrs). Organization is described, outbreaks listed and warnings quoted. The results are analyzed with synoptic charts preceding outbreaks. *Subject Headings:* **1. Potato blight forecasting 2. Ireland.**—*C.E.P.B.*

5.5–71 551.509.59:632.4:633.491

Smith, L. P., **Forecasting outbreaks of potato blight.** *Meteorological Magazine*, London, 82(970):113–115, April **1953.** fig., ref. **DWB**—Account of a successful 3-year trial of potato

blight warnings in England and Wales issued when for 48 hours screen temperature did not fall below 50°F and relative humidity did not fall below 75%. *Subject Headings:* **1. Potato blight forecasting 2. Wales 3. England.**—*C.E.P.B.*

ARTIFICIAL PRECIPITATION

5.5–72 551.509.67

Beaumont, R. T.; Work, Robert A., Frost, W. T. and Barton, Manes, **Use of snow surveys in evaluating cloud-seeding operations.** *Western Snow Conference, 20th, Sacramento, Calif., April 1952, Proceedings*, p. 56–72, 1952. 7 figs., 6 tables, 21 refs. **DWB**—Water content in snow on target and control areas, located in Oregon, is compared for 10–19 years of observation. The resulting correlation is .80 or higher. Cloud seeding activities in 1949–51 are summarized and precipitation maps are shown. No evidence for a positive effect of cloud-seeding was found, but on the contrary a statistically significant decrease of the water-equivalent in comparison with the normal climatic regime was computed. *Subject Headings:* **1. Cloud seeding evaluation 2. Snow surveys 3. Oregon.**—*A.A.*

5.5–73 551.509.67

*California. Univ. Statistical Laboratory, **On the methodology of evaluating cloud seeding operations.** A report to the Division of Water Resources, Dept. of Public Works of the State of California on the work performed at the Statistical Laboratory. April 1953. 119 p. 13 figs., 4 tables, 6 refs., eqs. **DWB**—The evaluation of the effectiveness of cloud seeding, computing the "percent of normal" was found to be entirely unreliable. The regression method, comparing target and control areas, is open to certain criticism and doubts insofar as the relations change from one type of storm to another. A detailed analysis of a sample case shows that seeding probably increased the seasonal precipitation by 0.41 inch for one type of storm, but decreased it by 0.85 inch or 0.14 inch for other types. A randomized experiment is suggested in order to produce documentary evidence of the effectiveness of cloud seeding. *Subject Headings:* **1. Cloud seeding evaluation 2. Statistical studies 3. California.**—*A.A.*

5.5–74 551.509.67

Elliott, Robert D. (*N. American Weather Consultants*), **Methods of evaluation in cloud seeding.** *Western Snow Conference, 20th, Sacramento, California, April 1952, Proceedings*, No. 73–79, 1952. 3 figs., 4 refs. **DWB**—Snow course water contents and rainfall amounts are compared for control and target areas in the High Sierra, at San Diego and on the Bitterout Mountains (Idaho). In practically all cases a positive effect of cloud seeding was found. *Subject Headings:* **1. Cloud seeding evaluation 2. Western United States.**—*A.A.*

5.5–75 551.509.67

Gabites, J. F., **Artificial stimulation of rainfall.** *New Zealand. Meteorological Office, Circular Note*, No. 66, Nov. 13, 1950. 6 p. 9 refs. **DWB**—Clouds whose tops have temperatures between 0°C and −10°C or 15°C normally contain supercooled liquid water droplets. The introduction of suitable sublimation nuclei such as silver iodide crystals, or the formation of ice crystals following the passage of pellets of solid carbon dioxide, results in a change from a liquid to an ice crystal cloud. In favorable conditions, large snowflakes may form and melt into raindrops, resulting in the dissipation of the cloud as a trail of precipitation, some of which may reach the ground. Nucleation with silver iodide smoke from the ground is cheap but offers little control of the time or place of the cloud seeding. If no favorable opportunities are to be lost, seeding from aircraft becomes necessary. It is estimated that the average rainfall over the Taupo Catchment could be increased by an amount of the order of one tenth of one per cent, with a value in terms of electricity of the order of £2000 per annum. The cost of the operation would probably exceed this figure several fold. *Subject Headings:* **1. Artificial precipitation 2. Cloud seeding with silver iodide.**—*Author's abstract.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

STRUCTURE OF THE ATMOSPHERE

See also: **Physics of stratosphere** (Goody), 5.5–5; **Radio echo studies of meteor ionization** (Kaiser), 5.5–6; **High altitude rocket research** (Newell), 5.5–7; **Annual duration of sunshine in upper atmos.** (Lönnqvist), 5.5–120; **Solar radiation in upper atmos.** (Nicolet), 5.5–123; **Continuous layer formation in atmos. under influence of solar radiation** (Kallmann), 5.5–235.

5.5–76 551.510.3:523.5

Link, F., **Exploration météorique de la haute atmosphère.** [Meteoric exploration of the upper atmosphere.] *I.U.G.G. Association of Terrestrial Magnetism and Electricity, IATME Bulletin*, No. 13:496–499, **1950.** fig., refs., eqs. **DWB**—Calculation of the heat gain and loss by meteors entering the atmosphere indicate that in the layer where most meteors are visible (from 80 to 110 km) the greatest density gradient (β) = $.72\times10^{-6}$ cm^{-1}. Twilight measurements gave $\beta = .56\times10^{-6}$ cm^{-1}. WHIPPLE's calculations from meteors gave $\beta = 1.4\times10^{-6}$ which is considered completely out of the range of possible values and could only occur on the assumption of a heat exchange only 0.1 that which would be necessary for complete fusion. Graphs show that the height interval of visibility ($Ha-Hb$) increases on the whole with increasing altitude (50–150 km) indicating that the density gradient β decreases with increasing altitude. *Subject Headings:* **1. Meteoric exploration of atmosphere 2. Density gradient in upper atmosphere 3. Upper atmosphere density.**—*M.R.*

5.5–77 551.510.41:523.4

Buscombe, William (*Mt. Wilson and Palomar Obs.*), **Planetary atmospheres. Summary of an illustrated Alexander F. Morrison lecture given at San Diego State College, Feb. 29, 1952.** *Astronomical Society of the Pacific, San Francisco, Leaflet*, No. 277, May **1952.** 8 p. tables **DLC**—Current knowledge on planetary atmospheres is summed up by brief comments on each planet. A table of planetary escape velocities, surface temperatures and chemical composition of atmospheres, based on SIR JAMES JEAN's computations and on spectroscopic measurement, is presented. *Subject Heading:* **1. Planetary atmospheres.**—*G.T.*

5.5–78 551.510.41:551.510.534:551.515.8(71

*Gowan, E. H. and Leppard, R. E., **Meteorological variations in the quantity of atmospheric ozone over Edmonton (lat. 53°34′N, long. 113°31′W).** *Canadian Journal of Physics*, 31(5):702–713, July **1953.** 8 figs., 3 tables, 11 refs. **DLC**—In order to determine the relation of ozone in the atmosphere to frontal passages, air masses, föhn (Chinook) winds, etc. observations were made at Edmonton (53°N) with a Dobson ozone spectrometer with direct sun, clear zenith and cloudy zenith sky observations, separately or in rapid succession if conditions warranted, during the period from Aug. 2, 1950 to Dec. 31, 1952. Ten day averages of ozone amount were compared with similar data for Oxford (same lat.) for 1926–30. Distribution of O_3 around a low pressure system in each season, and around a vigorous high pressure system (polar continental), a large Pacific air mass and a small slow moving air mass is shown in separate diagrams. Low values of O_3 are associated with flow of warm air from mid-continent or from the ocean in middle latitudes, into a low pressure area. High values are associated with cold polar air and subsidence, and the polar front runs to the line of demarcation between the below normal and above normal values. Low values usually extend 500 mi ahead of the cold front into the warm air mass. Highest average values occur in spring (March) and lowest in fall (Oct.) at both Edmonton and Oxford. *Subject Headings:* **1. Ozone data 2. Ozone-air mass relationships 3. Edmonton, Alberta.**—*M.R.*

5.5–79 551.510.41 523.4

†*Flagstaff, Arizona. Lowell Observatory, **The study of the planetary atmospheres.** Contract AF19(122)-162, Final Report, Sept. 30, **1952.** 289 p. tables, diagrs., refs. throughout, eqs. **DWB**—Since Lowell Observatory had 50 years of photographs of the surfaces of the planets to use as "Weather Maps" for a study of their day to day circulation, a project to study the atmospheres of planets (Mars and Jupiter, Venus and Saturn) was begun a

Lowell Observatory under contract with the U. S. Weather Bureau in 1948. Since 1949 it has been sponsored by the Geophysics Research Directorate of the U. S. Air Force. The similarities of the circulations of the planets to those of the earth were thought to be of value in studying the general circulation of the latter planet. A number of papers by HESS, MINTZ, LORENZ, BLACKADAR and others have already been published. Others will be abstracted separately. A long summary of the results and conclusions arranged by planets (Mars, Venus, Jupiter, Saturn) and solar variations, by E. C. SLIPHER, appears on p. 274–290, after the separate reports by the various authors. *Subject Headings:* **1. Planetary atmospheres. I. Slipher, Earl C.** (*dir.*) **II. Contract AF 19(122)-162 III. Hess, Seymour L. IV. Blackadar, Alfred K. V. Giclas, Henry L. VI. Shapiro, Ralph VII. Lorenz, Edward N. VIII. Gifford, Franklin A. IX. Mintz, Yale X. Johnson, Harold L.**—*M.R.*

5.5–80 551.510.41:523.4

Kuiper, Gerard Peter (*Yerkes Obs., Chicago Univ.*), **Planetary atmospheres and their origin.** (In: Kuiper, G. P. (*ed.*), **The atmospheres of the earth and planets.** Rev. ed. Chicago, Univ. of Chicago Press, **1952.** p. 306–405. figs., 10 tables, numerous refs., eqs.) **DWB**—The author discusses the restrictions put on the presence of planetary atmospheres by the velocity of escape, the composition and origin of the earth's atmosphere, the escape of the protoatmosphere, the origin and expected composition of planetary atmospheres, the structure of planetary atmospheres and the problems of the atmosphere of the planet Mars. *Subject Headings:* **1. Planetary atmospheres 2. Mars.**—*I.L.D.*

5.5–81 551.510.41:551.501

Lichtin, Norman N., **The kinetics of the reactions of NO and O_2 with derivations of hexaphenylethane in inert media.** Boston Univ. Chemistry Dept., Contract AF 19(122)-405, Final Report [**1953?**] 9 p. **DWB**—Accomplishments of this project include construction and evaluating use of all special apparatus needed for the program of work, development of a method of analysis for hexaarylethanes, and synthesis of certain compounds of interest. In addition it has been found that the reaction of aromatic nitroso compounds with nitric oxide may hold some promise for development as a method of detecting nitric oxide in the atmosphere. *Subject Headings:* **1. Atmospheric composition 2. Nitric oxide. I. Boston Univ. Chemistry Dept. II. Contract AF 19(122)-405.**—*Author's abstract.*

5.5–82 551.510.41:551.1:523.4

Pereira, Flávio Augusto, **A evolução das atmosferas planetárias, especialmente a terrestre.** [Evolution of the planetary atmospheres, especially the terrestrial.] São Paulo, José Olympio, **1946.** 118 p. tables, 29 refs. In Portuguese, French, English and German summaries p. 100–116. **DWB**—Current knowledge on the composition and evolution of atmospheres is summed up from works of over 130 authors quoted in the text. In the first chapter, which mainly deals with the composition of the present terrestrial atmosphere, data on the percentage of atmospheric oxygen at various locations, on the total quantity and vertical distribution of atmospheric gases and comparative data on the composition of the earth's crust, the sun and meteorites are presented. Factors determining the evolution of the atmosphere, namely, gravitation and centrifugal force, and their effect on various atmospheric components are discussed in the second chapter. Chapter three is concerned with the evolution of planetary atmospheres of the solar system. In the fourth chapter the composition of the earth's atmosphere is examined at various stages of its evolution throughout cosmic and geological time. *Subject Headings:* **1. Atmospheric evolution 2. Atmospheric composition 3. Planetary atmospheres.**—*G.T.*

5.5–83 551.510.41:551.574.1

Vonnegut, Bernard and Neubauer, Raymond L., **Counting sodium-containing particles in the atmosphere by their spectral emission in a hydrogen flame.** Also Vonnegut, B., **Effect of halogens on the production of condensation nuclei by a heated platinum wire.** General Electric Research Laboratory, Project Cirrus, Occasional Report, No. 38/39; Contract DA-36-039-sc-15345, Occasional Report, No. 9/10, Oct. 1, **1952.** 18+3 p. 9 figs., refs. Also in: *American Meteorological Society, Bulletin,* 34(4):163–169, April **1953. DWB**—Sketch and

description of apparatus given and experimental data presented in graphical form for a period of seven months. No significant relation to other meteorological variables. Particles counted originate probably not only from ocean spray, but also from dust storms and human activity. Record of high counts caused by traffic over dusty road show definite maxima about 7 a.m. and 4 p.m. *Subject Headings:* **1. Aerosol counters 2. Atmospheric composition 3. Condensation nuclei. I. General Electric Research Laboratory, Schenectady, N. Y. II. Contract DA-36-039-sc-15345.**—*A.A.*

IONOSPHERE

5.5–84 550.384:551.510.535

Lewis, R. P. Waldo and McIntosh, D. H., **Diurnal and storm-time variations of geomagnetic and ionospheric disturbance.** *Journal of Atmospheric and Terrestrial Physics*, 3(4):186–193, May **1953.** 3 figs., 2 tables, 8 refs. **DWB**—Diurnal variation of critical frequency of F2 layer at Slough was compared with diurnal variation of geomagnetic K index at Abinger nearby, Jan. 1947–June 1951, at various levels of K, and two harmonic terms calculated. Results are complex. A 24-hr term is present in both, phase agreeing in summer and winter but not at equinoxes. Only f_0F_2 showed a relatively large and stable 12 hour term. Variations of horizontal force at Eskdalemuir and f_0F_2 during magnetic storms showed considerable agreement. *Subject Headings:* **1. Ionospheric disturbances 2. Magnetic disturbances.**—*C.E.P.B.*

5.5–85 551.510.535

Martyn, David Forbes, **Geo-morphology of F_2-region ionospheric storms.** *Nature*, London, 171(4340):14–16, Jan. 3, **1953.** 3 figs., 8 refs. **DWB**—Diurnal variations of minimum equivalent height and critical penetration frequency of F2 region are examined for different geomagnetic latitudes on magnetically disturbed days. All major F2 perturbations are associated with magnetic storms and are manifestations of a single world wide phenomenon associated with electrostatic field of solar diurnal current, but local effects vary markedly with local time and season. *Subject Heading:* **1. Ionospheric storms.**—*C.E.P.B.*

5.5–86 551.510.535

Martyn, D. F. (*Commonwealth Sc. and Ind. Res. Org., Canberra, Australia*), **Travelling disturbances in the ionosphere.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 11:195–198, **1952.** 8 refs. **DWB**—Brief note on the problems of the apparently unrelated phenomena in the F2 region are discussed, such as: 1) The anomalies in intensities of multiple reflections, 2) the apparently vertically travelling clouds of ionization, 3) the small disturbances of virtual height and critical frequency and 4) the systematic errors in direction finding. These may all be due to 100–200 km long waves of speed about 10^4 cm/sec that travel horizontally. *Subject Headings:* **1. Ionospheric reflection 2. Ionospheric disturbances.**—*W.N.*

5.5–87 55 551.510.535

Maurain, Charles Honoré, **L'étude physique de la terre; intérieur, couche superficielle, atmosphère.** [Physical study of the earth; interior, surface layer and atmosphere.] Paris, Presses Universitaires de France, **1949.** 127 p. **DWB**—Most of this pocket size book is concerned with the study of the interior of the earth and application of geophysical methods of prospecting or of investigating the structure of the earth's crust. Chap. IV consists of a non-technical discussion of the methods of exploring the atmosphere, including manned and sounding balloons (for temperature and pressure), pilot balloons (for wind) and indirect methods such as by studying meteor trails, clouds, the aurora, light of the night sky, twilight phenomena, solar radiation, absorption by ozone and water vapor, explosive waves and radio waves or sferics. Lastly, the ionosphere and solar relations (variations in the solar constant and weather) are discussed. *Subject Headings:* **1. Geophysics 2. Upper atmosphere 3. Popular meteorology.**—*M.R.*

5.5–88 551.510.535

Meek, J. H. (*Radio Propagation Laboratory, Ottawa*), **Sporadic ionization at high latitudes.** *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, 7:96–104, Dec.

1950. 4 figs. **DWB**—Ionospheric records from northern Canada sometimes show rapid or erratic variations in frequency or height. Different types of sporadic ionization in the F-region and E-region are described. The speed of the sporadic "ionized clouds" is proportional to the virtual height, their occurrence increases with latitude. *Subject Headings:* **1. Ionosphere 2. Sporadic ionization 3. F layers 4. Canada.**—*A.A.*

5.5–89 523.74:551.510.535

Menzel, Donald H. (*Harvard Coll. Obs., Cambridge, Mass.*), **A new theory of solar activity and solar terrestrial relationships.** *International Council of Scientific Unions. Mixed Commission on Ionosphere, 2nd Meeting, Brussels, Sept. 1950, Proceedings*, Pub. **1951.** p. 38–44. **DWB**—The author renews briefly a theory that the sunspots and geomagnetic activity are both the result of "polar spicules" or eruptions in the corona near the solar poles, wherein ionized gases shoot out at high velocities along the sun's magnetic lines of force, then the lines of force sag and the whole mass of gas falls back into the sun, producing a sunspot as this gas is focused and condensed in the magnetic field. Large amounts of UV light released by this action may be responsible for SID's (sudden ionospheric disturbances). Auroras may result from small amounts of gas or corpuscles which manage to escape from the sun's magnetic field. A chart showing predictive values of solar radio wave reception, data obtained at McMath-Hulburt Observatory (Apr.–Oct. 1944) and subsequent geomagnetic storms (1 day lag) is included. *Subject Headings:* **1. Sunspots and magnetic storms 2. Solar eruptions 3. Sudden ionospheric disturbances.**—*M.R.*

5.5–90 551.510.535:621.396

Mitra, A. P. (*Div. of Radiophysics, C.S.I.R.O., Australia*), **Study of the ionosphere by extraterrestrial radio waves.** *Indian Journal of Physics*, Calcutta, 26(10):495–511, Oct. **1952.** 3 tables, 7 figs., refs. p. 510–511. **DLC**—The paper presents a comprehensive review of a novel method of studying the ionosphere in which the radio-frequency radiations from extra-terrestrial sources may be utilized. Four different types of measurements of such waves are discussed for this purpose, namely: 1) ionospheric refraction, 2) ionospheric attenuation, 3) twinkling of "radio stars" and 4) effects of sudden ionospheric disturbances (SID's). The available experimental results are compared with ionospheric theory and further lines of investigation which might profitably be followed are indicated. *Subject Headings:* **1. Ionospheric research 2. Radio frequency radiation.**—*Author's abstract.*

5.5–91 551.510.535

†Mitra, A. P. and Jones, R. E., **Theoretical and experimental study of the recombination coefficient in the lower ionosphere.** Pennsylvania. State College. Ionosphere Research Laboratory, Contract AF 19(122)-44, Scientific Report, No. 44, March 25, **1953.** 74 p. 3 tables, 17 figs., 62 refs., 46 eqs. **DWB**—The problem of the recombination of electrons and ions in the lower ionosphere is studied in two parts. Firstly, experimentally derived values of the effective recombination coefficient a are tabulated, and new values are calculated from ionospheric data both published and unpublished. Secondly, the theories of recombination are reviewed and a theoretical model is derived which is consistent with the empirical results, including those obtained from laboratory experiments. From the study of recombination during solar flares it has been possible to identify the height of the ionospheric current system responsible for geomagnetic solar flare effects. *Subject Headings:* **1. Recombination processes 2. Ionospheric currents 3. Solar flares. I. Pennsylvania. State College. Ionosphere Research Laboratory II. Contract AF 19(122)-44.**—*Authors' abstract.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

See also: **Elementary course in mechanics of atmos.** (Vialar), 5.5–11; **Height variation of lateral gustiness and its effect on lateral diffusion.**

5.5–92 551.511:551.551:533.15

Barenblatt, G. I. and Levitan, B. M., **O nekotorykh kraevykh zadachakh dlia uravneniia turbulentnoĭ teploprovodnosti.** [Some problems in the equation of turbulent heat transfer.]

Akademiia Nauk SSSR, Izvestiia, Ser. Matematicheskaia, 16(3):253–280, May–June 1952. 10 refs., eqs. **DLC**—Long and detailed solution of integral equations for heat transfer from a cylindrical surface in a turbulent current. Possible application to turbulent diffusion from a cylindrical (horizontal) column of smoke or a vertical cylindrical column of smoke or cloud. Reference is made to SUTTON's 1943 work. *Subject Headings:* **1. Heat transfer 2. Turbulent diffusion 3. Integral equations.**—*I.L.D.*

5.5–93 551.511:551.513.1

Blackadar, Alfred K., **The transformation of energy by the large scale eddy stress in the atmosphere.** *New York Univ. College of Engineering, Meteorological Papers*, 1(4), Sept. **1950.** 33 p. 13 figs., 6 tables, 38 refs., 94 eqs. **DWB, MH-BH**—A detailed theoretical study with practical applications. The energy of mean and eddy motion in a compressible fluid, its transformation and the relation of stress to mean velocity are discussed. The energy transformation in the averaged circulation of the atmosphere is computed for different cases over the United States and over India. The large scale energy transformation is usually positive in the atmosphere, but sometimes situations occur when, on the contrary, the energy of eddy motion is transformed into energy of mean motion. *Subject Headings:* **1. Energy transformation 2. Turbulence 3. Eddy stress.**—*A.A.*

5.5–94 551.511:551.55

Burgers, J. M., **Sur un modèle simplifié de la turbulence.** [A simplified turbulence model.] *France. Ministère de l'Air, Publications Scientifiques et Techniques*, No. 251:261–265, **1951.** fig., 8 eqs. **DWB**—Based on a simple one-dimensional equation:

$$\frac{\partial V}{\partial t} + V\frac{\partial V}{\partial y} = \nu\frac{\partial^2 V}{\partial y^2}$$

which is similar to the Navier-Stokes equation and can be used to express the correlation functions, BURGERS developed an equation which can account for the classification of kinetic energy. He considers the particular case of the correlations V_1V_2 and $V_1^2V_2$, where V_1 and V_2 are the values of V observed simultaneously at 2 points separated by a distance η so as to be able to study the relations proved by the equation for the propagation of the correlation. He then calculates these values for a distribution of values of V which form a sawtooth curve with oblique and vertical segments which enable the formulation of a simple model. *Subject Headings:* **1. Turbulence theories 2. Statistical theory of turbulence 3. Laboratory turbulence models.**—*M.R.*

5.5–95 551.511:551.55

Gandin, L. S., **Sravnitel'nyĭ analiz nekotorykh metodov opredeleniia koefitsienta turbulentnogo peremeshivaniia.** [A comparative analysis of some methods for determination of the coefficient of turbulent mixing.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia Trudy*, 16(78):52–84, **1949.** 17 figs., 20 refs., 64 eqs. **DLC**—A detailed comparative analysis of the two main directions in Russian studies on atmospheric turbulence. The tests are based on a large series of wind and temperature profiles, as well as on measurements of horizontal and vertical wind pulsations. The basic assumption of BUDYKO is that VON KÁRMÁN's constant does not hold for nonadiabatic conditions, but depends on stability. Besides PRANDTL's roughness height he introduces only one additional parameter, LAĬKHTMAN introduces two additional parameters in a modified power law. Actual independent observations show the superiority of BUDYKO's method, which was selected as the best second approximation. The influence of errors on the result is studied in detail, and nomograms are given for practical computations. *Subject Headings:* **1. Turbulence theory 2. Atmospheric turbulence 3. Exchange coefficient. I. Budyko, M. I. II. Laĭkhtman, D. L.**—*A.A.*

5.5–96 551.511:551.55

Holland, Joshua Z. (*U. S. Weather Bureau, Oak Ridge, Tenn.*), **The diffusion problem in hilly terrain.** *U. S. Technical Conference on Air Pollution, Wash., D. C., 1950, Air Pollution* **1950.** p. 815–821. 10 figs., 4 refs. **DLC**—In order to study the diffusion phenomena in Oak Ridge the author develops a method for reconciling the atmospheric diffusion phenomena

in hilly terrain with results of studies in level and mountainous territory. Owing to the great thickness of the layer affected by the macroscopic drag of the hills and the density variations as a result of both vertical and horizontal temperature changes, wind tunnel models are inapplicable. By the use of meteorological observations covering a range of conditions the values of the parameters in the wind profile equation were determined. The parameter of "friction velocity" derived from the logarithmic law indicates two distinct regimes, characterized by the presence in the one and the absence in the other of the hills or roughness parameters. *Subject Headings:* **1. Atmospheric diffusion 2. Roughness parameters 3. Orographic effects.** —*I.L.D.*

5.5–97 551.511

Mintz, Yale and Kao, Shih-kung (*Calif. Univ. at Los Angeles*), **The contour-channel method of computing the geostrophic poleward flux of sensible heat, angular momentum, or other atmospheric properties.** California. Univ. at L. A., Contract AF19(122)-48, Report No. 9, Pt. II, Sept. 15, **1951.** 4 p. 6 eqs. Also in: *U. S. Air Force. Cambridge Research Center, Geophysical Research Papers*, No. 24:99–101, **1953. DWB**—A method is demonstrated whereby the algebraic sum α_0 of terms (contour channel method) can be readily computed with IBM machines, and with less chance of computational errors, than with the older grid method using the sum of products of terms around a latitude circle. This method eliminates the measurement of the meridional component of the wind. *Subject Headings:* **1. Momentum transport 2. Contour-channel method 3. Punch card applications. I. Contract AF19(122)-48 II. California. Univ. at L. A.**—*M.R.*

5.5–98 551.511

*Mintz, Yale and Pyle, Robert, **The daily geostrophic poleward flux of angular momentum and daily contour heights and sea-level pressures.** California. Univ. at L. A., Contract AF19(122)-48, Report No. 9, Pt. I, Sept. 15, **1951.** 6 p.+tables, ref. **DWB**—Daily values for one month of J (total instantaneous poleward flux of angular momentum across a vertical surface $\sigma\phi$ at latitude ϕ) and of sea level pressure and contour heights for sea level, 700, 500, 300, 200 and 100 mb pressure surfaces over the Northern Hemisphere for every 5° latitude from 15° to 80°N. Analyses and computations were made by Bjerknes and Kochanski from punched cards (IBM) for each 5° intersection where data were available. All available surface and upper air analyzed charts of the U. S. Weather Bureau WBAN and Extended Forecast Section, and pilot balloon and radiosonde data were used. *Subject Headings:* **1. Angular momentum flux data 2. Contour height data 3. Northern Hemisphere charts 4. Punched card applications. I. California. Univ. at L. A. II. Contract AF19(122)-48 III. Bjerknes, Jakob IV. Kochanski, Adam.**—*M.R.*

5.5–99 551.511

Yih, Chia-shun (*Colo. Agr. and Mech. College*), **Laminar free convection due to a line source of heat.** Colorado. Agricultural and Mechanical College. Civil Engineering Dept., Contract N9onr-82401, NR 063-071/1-19-49, Report No. 7, Sept. **1952.** 9 p. 35 eqs. **DWB**—Closed solutions given for velocity and temperature distributions at Prandtl numbers $P_r=2/3$ and $P_r=4/3$. Results can be applied for heat transfer in air ($P_r=0.73$) and diffusion of water vapor in air ($P_r=0.60$). *Subject Headings:* **1. Convection 2. Heat transfer 3. Moisture transfer. I. Colorado. Agricultural and Mechanical College. Civil Engineering Dept. II. Contract N9onr-82401.**—*A.A.*

5.5–100 551.511:551.551

Yih, Chia-shun, **On the asymptotic behavior of any fundamental solution of the equation of atmospheric diffusion and on a particular diffusion problem.** Colorado. Agricultural and Mechanical College. Civil Engineering Dept. Contract N9onr-82401, NR 063-071/1-19-49, Report No. 8, Sept. **1952.** 11 p. 37 eqs. **DWB**—If wind velocity and diffusivity increases monotonically with height then the "amplitude" decreases asymptotically. Results applied to the calculation of horizontal vapor concentration in the direction x, assuming a power function for wind variation with height and knowing the vertical distribution of vapor for $x=0$. *Subject Headings:* **1. Atmospheric diffusion 2. Horizontal diffusion. I. Colorado. Agricultural and Mechanical College. Civil Engineering Dept. II. Contract N9onr-82401.** —*A.A.*

5.5–101 551.511

Zubenok, L. I., **Sravnenie razlichnykh sposobov opredeleniia vertikal'nogo turbulentnogo teploobmena podstilaiushcheĭ poverkhnosti s atmosferoĭ.** [Comparison of different methods for determination of vertical turbulent heat exchange of the underlying surface with the atmosphere.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy,* 16(78):131–134, **1949.** 2 figs., 6 refs., 6 eqs. **DLC**—The radiation balance for one single summer day is compared with heat losses due to turbulent exchange and evaporation on the basis of three complete and simplified turbulence equations, proposed by BUDYKO and also by means of an exchange coefficient computed from wind fluctuations. It is shown that the temperature of the soil surface can be estimated, knowing the temperature difference between the heights 55 and 200 cm. *Subject Headings:* **1. Convection 2. Turbulent transfer of heat.**—*A.A.*

GENERAL CIRCULATION

See also: **Energy transformation by large scale eddy stress** (Blackadar), 5.5–93; **Rainfall of Central Cuba** (Howell), 5.5–173.

5.5–102 523.45:551.513.1

Hess, Seymour L., **The general atmospheric circulation of Jupiter.** (In: Flagstaff, Arizona. Lowell Observatory, The project for the study of planetary atmospheres, Contract AF19(122)-162, Annual Report, Sept. **1950.** p. 39–46. photo., diagrs., refs., eqs. Mimeo.) **DWB**—The principal features of the general circulation of Jupiter, namely, the "equatorial circulation" and the gradually decreasing acceleration poleward, are described. SCHOENBERG's explanation of the "equatorial circulation" by means of the equations of motion on a sphere and by the physical assumption that the energy of this acceleration is provided by the ascent of heated gases from the planet's interior at the latitudes of the North and South Equatorial Belts, is discussed critically. It is suggested that the exchange of air between latitudes is brought about by large scale eddies lying in horizontal planes and having vertical axes. The observed rotation period below 15° latitude corresponds to the assumption of a constant transport of vorticity; poleward the planet exhibits nearly solid rotation. The behavior of the Equatorial Zone is explained physically by means of temperature differences between the dark and bright equatorial belts. *Subject Headings:* **1. Planetary circulation 2. Planetary atmospheres 3. Atmospheric circulation 4. Jupiter. I. Flagstaff, Arizona. Lowell Observatory II. Contract AF19(122)-162.**—*I.L.D.*

5.5–103 551.513.2:551.515

Czapski, Ulrich, **Über den "cut-off"-Vorgang und die Wiederherstellung der Vierer-druckfelder.** [On the cut-off process and the recurrence of the quadruple pressure field.] *Annalen der Meteorologie,* 5(7–12):321–327, **1952.** 4 figs., 15 refs. German and English summaries p. 321. **MH-BH**—From 500 mb charts over Europe a kinematic scheme is deduced. The cut-off of a deep southward pointing trough follows from Rossby waves if the 500 mb topography is taken as an equivalent level for a quasibarotropic atmosphere. Development is shown schematically and illustrated by charts for April 6–11, 1950. *Subject Heading* **1. Waves in the westerlies.**—*C.E.P.B.*

5.5–104 551.513.2:551.589.1

Lamb, H. H., **Hemisphere-wide circulation patterns and type-classification.** *Great Britain. Meteorological Research Committee, M.R.P.,* 632, April 20, **1951.** 7+p. tables, 6 refs. Mimeo. **DWB**—The validity of the use of the normal sea-level pressure and wind distribution, which are represented by mean annual figures, as a circulation model is questioned. Ten types of circulation patterns are defined and described in detail. Northern Hemisphere weather maps for six years were classified by this scheme. The frequency of occurrence of these types, their seasonal distribution and their persistence and duration are given in tables. Their dimensions, corresponding patterns in the upper air and corresponding weather types in the British Isles are discussed. A comparison of the Northern Hemisphere types with local types of weather occurring in the British Isles failed to reveal a rigid correspondence

with the hemisphere pattern. *Subject Headings:* **1. Atmospheric circulation 2. Pressure distribution 3. Wind distribution 4. Synoptic climatology 5. Weather types 6. British Isles.**—*I.L.D.*

5.5–105 551.513.2:551.515.8(54)

Malurkar, S. L. (*Colaba Observatory, Bombay*), **A reply to "Some aspects of tropical meteorology with special reference to the Indian weather—an examination of Malurkar's concepts regarding them."** *Indian Journal of Meteorology and Geophysics*, 3(4):303–307, Oct. 1952. 27 refs. **DWB**—A reply to the extensive criticism of the authors book: "Forecasting Weather in and near India" (1945) and other published papers made by B. N. DESAI (*see item* 3.1–95, Jan. 1952, *MAB*). The main problem discussed is the origin of the summer monsoon in India and the transportation of air across the equator from the Southern Hemisphere. The list of papers include 18 items published by the author on this subject. *Subject Headings:* **1. Monsoons 2. Atmospheric circulation 3. Air masses 4. Weather forecasting 5. India. I. Desai, B. N.**—*A.A.*

ATMOSPHERIC DISTURBANCES

See also: **Radar echoes from thunderstorm** (Wexler), 5.5–33; **Tornado forecasting** (Fawbush, Miller), 5.5–66; **Tornado situations, March 17, 1951** (Fawbush, Miller), 5.5–69; **Met. variations in quantity of atmos. ozone** (Gowan, Leppard), 5.5–78; **Cut-off process and recurrence of quadruple pressure field** (Czapski), 5.5–103; **Tropical met. with special reference to Indian weather** (Malurkar), 5.5–105; **Arch squall,** 5.5–167.

5.5–106 551.515.2

Pflugbeil, Werner, **Die Bahn des Hurrikans "Carol."** [The track of the hurricane "Carol."] *Wetterlotse*, No. 61/62:196–199, Sept./Oct. **1953.** fig. Also: Rodewald, Martin, **Die geschätzten Windgeschwindigkeiten im Hurrikan "Carol."** [Estimated wind velocities in hurricane "Carol."] *Ibid.*, p. 199–201. table. And: **Die Asymmetrie des Sturmgebiets in tropischen Zyklonen.** [The asymmetry of the storm area in tropical cyclones.] *Ibid.*, p. 201–203. table. And: **M. S. "Brandenburg" und Hurrikan "Carol."** [M. S. "Brandenburg" and hurricane "Carol."] *Ibid.*, p. 205–208. fig., table. **DWB**—This tropical disturbance began as a small depression in the Sahara on Aug. 26, 1953, moving WSW. It is traced across Atlantic to 33°N 66°W then north to American coast on Sept. 7 and South Greenland on 9th, after which it split in two. Estimated wind speed on Sept. 4–5 reached 130 knots, but the report of 170 kn on 4th is probably too high for measured pressure of 950 mb in center. Stormy area extended much further to NE than to SW. Detailed reports of wind and weather from "Brandenburg" on Sept. 3–4 are given. *Subject Headings:* **1. Hurricanes 2. Hurricane "Carol" (1953). I. Rodewald, Martin.**—*C.E.P.B.*

5.5–107 551.515.3

Abdullah, Abdul J. and Tepper, Morris, **A proposed mechanism of squall lines: the pressure jump line.** *Journal of Meteorology*, 10(4):298–300, Aug. **1953.** fig., 5 refs. **MH-BH**—ABDULLAH questions two statements in paper by TEPPER (*see item* 7–48, July 1950, *MAB*). TEPPER replies. *Subject Headings:* **1. Line squalls 2. Pressure jumps.**—*C.E.P.B.*

5.5–108 551.515.4(04)

Manalo, Eugenio, **On thunderstorms.** *Philippines. Weather Bureau, The Elements*, 1(4):6–7, 13, April **1953.** ref. **DWB**—Rudimentary knowledge on the conditions of thundercloud formation, on physical properties of such clouds and on various types of thunderstorms is summed up. For pilots encountering thunderstorms over the sea the author recommends flight below the cloud base where turbulence is not very strong. *Subject Headings:* **1. Thunderstorms 2. Popular meteorology.**—*G.T.*

5.5–109 551.515.8:551.524.7(768)

*Ross, Robert B. (*U. S. Weather Bur., Wash., D. C.*), **The dry air centered around Nashville, Tenn., July 22, 23, 24, 1952.** *Monthly Weather Review*, 80(7):123–127, July **1952.** 13

figs., table, 3 refs. **MH-BH**—An unusually dry air mass was traced on the 850 mb chart from Nantucket, Mass. on July 14, 1952 around the Bermuda High to the SE, S, SW, W across Florida to the Gulf, North over Louisiana to Arkansas and Central Tennessee on 23 July. Soundings presented for Nantucket, Bermuda, Miami, Lake Charles, Little Rock and Nashville confirm the marked drop in dew point aloft (900 to 700 mb) when this air mass passed over. The dry air advected into this region from the Gulf prevented rain when a cold front came through the drought area of Tennessee on July 24. Record high temperatures also occurred during this period. *Subject Headings:* **1. United States drought (1952) 2. Advection of dry air masses 3. Bermuda anticyclone 4. Tennessee.**—*M.R.*

5.5–110 551.515.8(269)

§Rubin, Morton Joseph (*U. S. Weather Bureau*) and Van Loon, Harry (*Mass. Inst. of Tech.*), **Polar highs in relation to the Southern Hemisphere circulation.** Paper presented at Spring Meeting of the American Meteorological Society, Wash., D. C., May **1953.** 9 p. charts. Typescript. **DWB**—According to our present knowledge, strong polar outbreaks from the Antarctic continent which block the normal zonal flow and reach lower latitudes occur rather infrequently. An example of such outbreak in July 1950 is discussed in some detail, showing the drop of temperature and raob data at checkpoints in the Southern Atlantic Ocean. Furthermore, one of the more usual weaker polar highs which is carried away by the zonal flow is discussed. *Subject Headings:* **1. Polar outbreaks 2. Polar highs 3. Antarctic Ocean.**—*A.A.*

5.5–111 551.515.8(4, 7)

*Treidl, Rudolph, **European air masses.** *Canada. Meteorological Div., Cir.* 2298, Tec. 150, May 19, **1953.** 24 p. 3 figs., 11 tables, 7 refs. **DWB**—A review based mainly on the work of SCHERHAG and SCHINZE. For comparison, North American air masses are characterized on a Rossby diagram and together with European air masses on Schinze's thetagrams. The homologues for the corresponding air masses differ widely between the two continents. *Subject Headings:* **1. Air masses 2. Thetagrams 3. Europe 4. North America.**—*A.A.*

5.5–112 551.515.81

§U. S. Air Weather Service, **The Arctic front in the Far East, prepared by members of the Tokyo Weather Central.** *U. S. Air Force, 2143D Air Weather Wing Technical Bulletin,* No. 8:28–57, Jan. **1952.** charts. **DWB**—A long series of 6-hourly surface charts and daily 700 mb charts (analyzed at the Tokyo Weather Central) are presented for Dec. 16–21, 1950 and the movements of troughs in relation to the topographic features of East Asia (Manchuria, the Maritime Provinces and Sea of Japan) analyzed. Experience has shown that fronts are often drawn where orographic or lee troughs appear on the charts. After trying to force a movement of these "fronts" the analyst is always reduced to making them retrograde. The temperature field must therefore be considered carefully before placing fronts in this area. "Correct" analyses are suggested and illustrated. *Subject Headings:* **1. Synoptic analysis 2. Orographic troughs 3. Cold fronts 4. East Asia.**—*M.R.*

5.5–113 551.515.81

§Sawyer, J. S., **The free atmosphere in the vicinity of fronts—analysis of observations by the Meteorological Research Flight (1950–52).** *Great Britain. Meteorological Research Committee, M.R.P.*, 807. May 9, **1953.** 13 p. 17 figs., 5 tables, 4 refs. Mimeo. **GB-MO**—Analyzes 23 flights to study structure of fronts, with temperature and frost point profiles, synoptic situations and cross sections. Discussion deals with thermal, humidity and cloud structure and turbulence (not especially great except in convective clouds), illustrated by frequency histograms. Results showed the great complexity of frontal regions. Fronts are associated with a sloping baroclinic zone; about half the temperature contrast lies within a width of 100–200 mi. Irregularities of temperature of 1–5°F are associated with condensation, precipitation and evaporation. Main frontal cloud usually forms in warm air and extends into transition zone. *Subject Heading:* **1. Frontal structure.**—*C.E.P.B.*

5.5–114 551.515.827

§Reinecke, Ingrid, **Fronten in der Stratosphäre?** [Fronts in the stratosphere?] *Annalen der Meteorologie*, 5(7/12):346–352, 1952. 9 figs., 6 refs. **MH-BH**—Departures from the normal compensation in the stratosphere (cold air over warm, warm over cold) are discussed. Areas of departure in the stratosphere are larger and move more slowly than in troposphere. Marked discontinuities are rare but do occur, e.g., a "stratosphere warm front" on Feb. 20, 1952. The development of discontinuities is favored in the stratosphere by the greater stability, owing to which the same vertical movement causes much greater temperature differences. *Subject Heading:* **1. Stratospheric fronts.**—*C.E.P.B.*

5.5–115 551.515.83

Kimura, K., **Objective methods in air mass and front analysis.** *Journal of Meteorological Research*, Tokyo, 4(3):106–117, May 1952. 2 tables, 9 figs. In Japanese; English summary p. (8). **MH-BH**—A "TE diagram" is introduced following the Rossby diagram. It gives information as to changes in the position of characteristic points. By "characteristic vapor pressure" (vapor pressure at the stable dry stage) and "air mass temperature" (equivalent temperature of the mass at the zero stage of the outer heat), the air mass character is defined quantitatively, and the front is defined by the variation in air mass temperature. Thus a means is provided for analyzing frontal phenomena as well as air mass character. *Subject Headings:* **1. Air mass characteristics 2. Frontal analysis.**—*From author's abstract.*

5.5–116 551.515.83:551.583.13:551.515.23

Matsukura, H., **The secular change of equatorial front, air temperature and number of typhoon occurrence.** *Journal of Meteorological Research*, Tokyo, 4(5):163–168, Aug. 1952. 5 figs. In Japanese; English summary p. (13). **MH-BH**—The author investigated the secular change of equatorial front and obtained the following results: (1) 27–30 year period of south-north or east-west oscillation of equatorial front in summer season coincides with the period of air temperature at Ishinomaki in August. (2) Latitude variation of recurvature point of typhoon has a 10–11-year period. (3) Curvature of typhoon path may be an index of general circulation, and the index has a 7–8-year period. When the index has maximum value, typhoon moves northward, while minimum index means westward movement. (4) In cold summer there often occur southward movement of equatorial front and eastward movement of polar front, and in hot summer the reverse relation holds good. *Subject Headings:* **1. Tropical fronts 2. Typhoon tracks 3. Weather cycles 4. Japan.**—*Author's abstract.*

RADIATION AND TEMPERATURE

RADIATION

See also: **Correlation of cosmic ray ionization measurement at high alt., sea level and neutron intensities at mountain tops** (Neher), 5.5–236.

5.5–117 621.311.23:551.521.1:621.311.24:551.556.3

Marshall, C. W., **Supplementary sources of power: wind, volcanic heat, sun and tide.** *Royal Society of Arts, Journal*, 100(4873):452–468, 16 May, 1952. 5 figs., 8 refs. Discussion pp. 464–468. **GB-MO**—Describes installations for wind electrical generation and recent British research. Geothermic power stations in Italy are described and the possibility of using vertical differences of sea temperature considered. Solar radiation heat pumps in U.S.A. and proposed plant for tidal energy discussed. *Subject Headings:* **1. Solar generators 2. Wind generators.**—*C.E.P.B.*

5.5–118 551.521.11

Gabites, J. F., **A preliminary estimate of the mean daily insolation in New Zealand.** *New Zealand. Meteorological Office, Circular Note*, No. 17, March 15, 1951. 7 p. 4 figs., 3 refs., eqs. **DWB**—The mean daily insolation on a horizontal surface is computed for each month in New Zealand for the case of clear skies, using transmission coefficients based on measurements by Fowle and mean amounts of water vapour measured at radiosonde stations. Adjustments for average cloudiness are made on the basis of maps of mean percentage sunshine. The estimates of mean daily insolation are presented in the form of monthly maps intended

to serve as a guide until directly observed data become available. *Subject Headings:* **1. Insolation 2. New Zealand.**—*Author's abstract.*

5.5–119 551.521.11(41/2)

*Great Britain. Meteorological Office, **Averages of bright sunshine for Great Britain and Northern Ireland 1921–50.** London, H.M.S.O., **1953.** 32 p. mainly tables, 4 refs. Mimeo. M.O. 572. **GB-MO**—Tables are given for each month of monthly totals and daily means of sunshine recorded by Campbell-Stokes recorders for numerous stations. Possible durations in each month in latitudes 50–60°N are also given. Comparison with values for 1901–30 and 1906–35 shows no systematic change. *Subject Headings:* **1. Sunshine duration 2. British Isles 3. Northern Ireland.**—*C.E.P.B.*

5.5–120 551.521.11:551.510.53

Lönnqvist, Olov, **The annual duration of sunshine in the upper atmosphere.** *Annalen der Meteorologie*, 5(7–12):202–206, **1952.** 5 figs., 5 refs. English and German summaries p. 202. **MH-BH**—Duration of sunshine is shown in graphs for 0–1000 km, 90°N–90°S for March, April, May and June, and year. Above 575 km poles have permanent sunshine. Energy per unit area at various levels and latitudes is plotted and compared with temperature and wind profiles. The possibility that the excess of solar radiation in high latitudes causes the observed excess of mean temperature above the tropopause is discussed. *Subject Heading:* **1. Sunshine in the stratosphere.**—*C.E.P.B.*

5.5–121 551.521.3

Person, H. (*Bioclim. Section, Germany. Met. Serv., French Zone*), **Einige Bemerkungen zum neuen Linkeschen Trübungsfaktor.** [Comments on the new Linke turbidity factor.] *Germany. Deutscher Meteorologischer Dienst im Französischen Besatzungsgebiet, Wissenschaftliche Arbeiten*, 2:78–81, **1950.** 2 figs., 2 tables. French summary p. 81. **DLC**—The turbidity factor T or Θ introduced by LINKE into the extinction formula as a measure of atmospheric turbidity, requires an accurate knowledge of the solar constant I_0. Theoretically the measurement of solar intensity at two different solar heights (corresponding to two different air masses M_1 and M_2) makes it possible to eliminate I_0 provided that turbidity conditions do not change between the two measurements. A series of measurements made in summer 1947 is discussed. It reveals the effect of turbidity fluctuations and measurement errors of the two individual measurements (with $M_1=2$ and $M_2=3$) on the accuracy of determining the turbidity factor. *Subject Heading:* **1. Turbidity factor.**—*Transl. of author's abstract.*

5.5–122 551.521.3:551.521.61:551.576 551.591:551.576

Sadowski, Alexander (*U.S.A.F., Aircraft Radiation Lab.*), **Measurement of infrared transmission through clouds on Mt. Washington, using infrared receiving set AN/AAR-6.** *U. S. Wright Air Development Center; WADC Technical Report*, 52-174, April **1952.** 53 p., 7 figs., 16 tables, 11 refs., 18 eqs. **DWB**—In order to obtain information on the infrared transmission through water vapor clouds under conditions similar to those prevalent during airplane flights in clouds at intermediate levels of the troposphere, measurements were made at Mt. Washington, N. H. (6293 ft above MSL) with a monochromator. Simultaneously Mt. Washington Observatory (Weather Bureau) personnel measured liquid water content and cloud drop size distribution. Checks on visibility were made with naked eye and with a visible light transmission meter. Six runs were made (most observations were made at night) and the detailed data presented and analyzed. Equipment is described and illustrated, and scatter diagrams presented to show relation of transmission in various wave lengths to drop size distribution or total cross sectional area of cloud (fog) droplets. Since there is extreme variability of conditions on Mt. Washington, results are not as conclusive as desired. *Subject Headings:* **1. Infrared transmission through clouds 2. Visibility in fog 3. Mt. Washington, New Hampshire.**—*M.R.*

5.5–123 551.521.6:551.510.53

*Nicolet, Marcel (*Royal Met. Inst. Belgium*), **Actions du rayonnement solaire dans la haute atmosphère.** [Action of solar radiation in the upper atmosphere.] *Annales de Géophysique*,

(3(2):141–193, Apr./June **1952.** 12 figs., 4 tables, 26 refs. English and French summaries, p. 141–142. **DWB**—A comprehensive analysis of the absorption of solar radiation in the upper atmosphere is given. Data on the distribution and intensity of the different components of solar radiation, on the number of photons available at the top of the atmosphere and on absorption and ionization processes due to various atmospheric constituents are presented in tables, graphs and diagrams and discussed in detail. *Subject Headings:* **1. Radiation effects 2. Upper atmosphere.**—*G.T.*

AIR TEMPERATURE

See also: **Night cooling under clear sky** (Parry), 5.5–63; **Dry air around Nashville, Tenn., July 1952** (Ross), 5.5–109.

5.5–124 551.524.2:551.56(469)

*Portugal. Serviço Meteorológico Nacional. **Frequency of simultaneous occurrence of specified conditions of air temperature and wind at Lisbon Airport.** *Portugal. Serviço Meteorológico Nacional, RT* 127, MEM 24, May 25, **1953.** 9 p. mostly tables. Also in its *Memorias*, v. 11, **1953. DWB**—Sixteen tables give number of occasions of simultaneous occurrence of air temperature and speed of wind component along the main runway with specified ranges for Jan., April, June and Oct. for 0200, 0800, 1400 and 2000 6 MT for Lisbon Airport (1948–1952). Temperatures are in °C and wind speed in knots. *Subject Headings:* **1. Temperature data 2. Wind data 3. Lisbon Airport, Portugal.**—*M.R.*

5.5–125 551.524.2(439.1)

*Simor, Ferenc, **Pécs 80 éves homogén hömérsékleti középértékei.** [80-year uniform temperature averages of Pécs.] *Időjárás*, 56(9/10):262–279, Sept./Oct. **1952.** 3 figs., tables, 20 refs. Russian and German summaries p. 325. **DLC**—Pécs (46°N lat.; 18°E long.) is one of the few cities in Hungary having continuous temperature records since 1871. However, the measurements having been made at eight different locations, the data are not entirely uniform. The author therefore investigates the correlation between temperature data obtained at the different stations in simultaneous measurement and establishes uniformity by applying monthly divergence index numbers to the original data. He then tabulates the standardized temperature data for the period 1871–1950. The tables include monthly, seasonal, semi-annual, annual, 10-year and 80-year mean temperature. Mean temperatures of Pécs and other Hungarian stations are compared. *Subject Headings:* **1. Temperature data 2. Pécs, Hungary.**—*G.T.*

5.5–126 551.524.3(569) 551.571.3(569)

*Ashbel, Dov (*Hebrew Univ., Jerusalem*), **Temperature and air humidity in Palestine and adjacent countries.** Jerusalem, **1945.** 90 p. entirely tables, 10 refs. t-p. and legends in English and Hebrew. **DLC**—Data obtained at over 50 stations (with geographic coordinates and elevations indicated) are presented in tabular form. They represent periods of observation of varying length (earliest records 1921, latest 1943). The values covered are hourly mean temperature and relative humidity for each month of the year; percentage frequencies of temperature thresholds by pentades; monthly mean temperature maxima, minima, averages and ranges, and absolute temperature maxima and minima; daily evaporation; and hourly wind velocity. *Subject Headings:* **1. Temperature variations 2. Humidity variations 3. Palestine.**—*G.T*

5.5–127 551.524.3:551.589.1

Garnett, Alice, **The study of diurnal temperature changes.** *Geography*, London, 37(1): 24–32, **1952.** 6 figs. **DLC, DWB**—The variety of diurnal variations of temperature in England is represented by thermograms for Ashop Valley, Derbyshire, showing passage of a warm front, cold air or cold front, anticyclonic weather (at hill and valley stations) and remarks on care of thermograph. *Subject Headings:* **1. Temperature variations 2. Synoptic climatology 3. Derbyshire, England.**—*C.E.P.B.*

5.5–128 551.524.36:551.583.14

*Schulze, Alfred, **Die Sommerwärme in Berlin nach der Beobachtungsreihe 1766–1952.** [Summer heat in Berlin 1766–1952.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:176–183, **1952.** fig., 4 tables, 13 refs. **DWB**—Sums of day-degrees above 20°C and numbers of days are tabulated monthly (April–Sept.) for each year and discussed statistically. Means: 1766–1800, 64.6; 1801–50, 47.3; 1851–1900, 43.8; 1901–52, 56.3. *Subject Headings:* **1. Hot summers 2. Climatic trends 3. Berlin, Germany.**—*C.E.P.B.*

5.5–129 551.524.37

§Coulter, J. D., **Frosts causing fruit losses at Alexandra.** *New Zealand. Meteorological Office, Technical Note*, No. 88, May 13, **1952.** 3 p. 19 charts, table, 2 refs. **DWB**—Data for frosts which caused fruit losses in the Alexandra district are listed and the synoptic situations described. Damaging frosts can be expected in October and November if a southerly air stream with rather extreme low temperatures covers the area, and a marked decrease in gradient with clearing skies can be forecast for some period during the night. *Subject Headings:* **1. Frost damage to fruit 2. Synoptic conditions for frost 3. Alexandra, New Zealand.**—*Author's abstract.*

SOIL TEMPERATURE

5.5–130 551.525.5(518)

Nakaya, Ukichiroo and Sugaya, Juji, **Report on permafrost surveying, Manchuria, 1943.** Translated by E. R. Hope from the original Japanese article in: *Low Temperature Science*, Sapporo, Japan, 2:119–128, **1949.** *National Research Council of Canada, Technical Translation* TT-382, **1953.** 12+p. 5 tables, 7 figs., eqs. **DWB**—Report on ground temperature measurements made by thermocouples in N. Manchuria during 10 days in Sept. 1943, the time of the deepest penetration of the active layer, in order to supply information for construction work on permafrost soil. Temperature and humidity data are given for the thaw and frost layer. The amount of frost heaving is estimated. *Subject Headings:* **1. Permafrost 2. Soil temperatures 3. Manchuria. I. Hope, E. R.** (*trans.*)—*A.A.*

SEA TEMPERATURE

See also: **Comparison of several heat and mass transfer networks of interest in water conservation** (Anderson, Marciano), 5.5–187.

5.5–131 551.526.8:551.482

*Wagner, Hubert, **Die Verwendung von Thermographen in fliessenden Gewässern.** [The use of thermographs in flowing waters.] *Deutsches Gewässerkundliches Jahrbuch, Besondere Mitteilungen*, No. 4:92–105, **1952.** fig., 4 tables, 10 refs. **DWB**—Our knowledge of diurnal temperature variations in flowing water is still insufficient. The use of thermographs is described. Data are added for the extreme and average daily temperatures, the temperature at 12:00 and the time of extreme temperatures from May 1950 to April 1951 for the Werre River at Lohne. *Subject Headings:* **1. River temperature variations 2. Werre River, Germany.**—*A.A.*

ATMOSPHERIC PRESSURE AND WIND

PRESSURE

See also: **Anomalous winds in free atmos.** (Gustafson), 5.5–149.

5.5–132 551.542.1:551.55

McDonald, James E. (*Dept. of Physics, Iowa State College*), **Remarks on the development of the Coriolis principle.** *American Meteorological Society, Bulletin*, 34(5):192–195, May **1953.** ref. **MH-BH**—The author discusses deficiencies in the presentation of the Coriolis principle resulting from the failure to consider the role of the frame of reference in the Newtonian description of dynamical systems. Specific suggestions for improving the conventional treatment of the Coriolis principle are presented. These include the idea of the asymmetry of Newton's second law of motion, developing the transformation of equations of motion t

noninertial coordinates in terms of a formal analysis of the simple case of a uniform and rectilinear coordinate system and the transformation from an inertial system to uniformly rotating coordinates. *Subject Headings:* **1. Coriolis force 2. Equations of motion.**—*I.L.D.*

5.5–133 551.543:639.12(261)

Römer, Ernst and Rodewald, Martin, **Zur Frage des Amerika-Weges Nord um Schottland.** [On the question of the route to America north of Scotland.] *Wetterlotse*, 48:215–221, Nov. **1952.** fig., table. **DWB**—Referring to note by Rodewald (*see item* 4.5–130, May 1953, *MAB*), Römer argues in favor of the northern route because of shorter distance and greater probability of E winds. Rodewald quotes wind data showing that the northern route has more strong winds and light breezes, the southern one more moderate winds, and thinks there is something to be said for the northern route. *Subject Headings:* **1. Marine navigation 2. North Atlantic.**—*C.E.P.B.*

5.5–134 551.543.3

§Nagao, T., **The mechanism of periodic pressure oscillation in Kanto District.** *Geophysical Magazine*, Tokyo, 23(4):367–372, May **1952.** 4 figs. **MH-BH**—An analysis of individual synoptic cases indicates that a definite temperature distribution precedes the 10-day periodic pressure oscillation, which extends up to the lower stratosphere. This periodic pressure oscillation in Kanto District is related closely to cyclone and anticyclone passage over Japan proper. Synoptic charts of weather at 500 mb surface and graphs of vertical structure of atmosphere are presented. *Subject Headings:* **1. Pressure oscillations 2. Synoptic studies 3. Kanto District, Japan.**—*I.L.D.*

5.5–135 525.6:551.543

Maksimov, I. V., **O "poliusnom prilive" v more i atmosfere zemli.** [On the "polar tides" in the sea and in the earth's atmosphere.] *Akademiia Nauk SSSR, Doklady*, 86(4): 673–676, **1952.** 2 tables, 6 refs. **DLC**—The monthly means of sea levels were used for analysis of nutation polar tides. The length of the period of free nutation of earth's axis was accepted as 14 months. The observations of level made in the northern parts of Atlantic and Pacific oceans, in Baltic and Mediterranean seas have shown noticeable oscillations in consequence of which the variations of the mean level of the Mediterranean were more than 5 cm. Investigation of 14 month oscillations of sea levels near Swinemünde (1811–1936), near Wilhelmshaven (1856–1911) and near Zuhaven (1856–1911) indicated a great variability of secular trend. The height of levels near Swinemünde diminished during the period 1811–1900, but since 1900 it is on the increase. The significance of secular variations of polar tides in the atmosphere was found by analysis of the pressure observations at Edinburgh (1770–1930), where these oscillations caused changes of the values of monthly mean pressure up to 4–5 mm. The range of the oscillations diminished up to 1850–1860 and increased after this date. The maximum of nutational oscillations of pressure is observed when the radius vector of earth's pole is passing the 180° meridian, and minimum when passing the Greenwich meridian. *Subject Headings:* **1. Nutation 2. Tides 3. Atmospheric tides.**—*N.T.Z.*

TURBULENCE

See also: **Method of investigating clear air turbulence** (James), 5.5–32; **Equation of turbulent heat transfer** (Barenblatt, Levitan), 5.5–92; **Simplified turbulence model** (Burgess), 5.5–94; **Comparative analysis of methods of determining coefficient of turbulent mixing** (Gandin), 5.5–95; **Asymptotic behavior of any fundamental solution of the equation of atmos. diffusion . . .** (Yih), 5.5–100; **Hill standing wave and safety heights** (Mason), 5.5–152.

5.5–136 551.551:551.508.53

Dubov, A. S., **Opredelenie skorosti vertikal'nykh poryvov vetra pri samoletnykh zondirovaniiakh s pomoshch'iu akselerografa.** [Determination of the velocity of wind gusts in airplane soundings by means of accelerometer records.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, 16(78):85–92, **1949.** 5 figs., tables, 8 refs., 7 eqs. **DLC**—The vertical velocity of wind gusts and the coefficient of exchange in the free atmosphere can be computed

by means of accelerometer records, made on an airplane, considering the air density, the weight and wing spread of the plane, etc. The author analyzed a set of eight differential equations, but failed to solve them, and proposes a simplified solution, which considers only larger eddies (over 7–8 m). An analysis of possible error is made. Samples of computations are presented, showing the superiority of the author's equation, which considers also the vertical velocity of the plane itself. A nomogram facilitates practical computations. *Subject Headings:* **1. Free air turbulence 2. Wind velocity 3. Airplane soundings 4. Accelerometer records.**—*A.A.*

5.5–137 551.551:519.241.1

†Favre, A.; Gaviglio, J. and Dumas, R., **Mesures de la correlation dans le temps et l'espace et spectres de la turbulence en soufflerie.** [Correlated measurements in time and space and the spectrum of turbulence in a wind tunnel.] *France. Ministère de l'Air, Publications Scientifiques et Techniques*, No. 251:293–309, **1951.** 16 figs., 14 refs. **DWB**—Elaborate measurement and recording equipment used in connection with a wind tunnel at the Institute of Fluid Mechanics in Marseille are described and illustrated. The correlation in time and space of turbulence elements, the spectrum of turbulence, etc. as determined from numerous experiments are shown graphically. *Subject Headings:* **1. Turbulence measurement 2. Turbulence spectrum 3. Correlation of turbulence elements 4. Laboratory turbulence models.** —*M.R.*

5.5–138 551.551:09

*†France. Ministère de l'Air, **Actes du Colloque International de Mécanique, Poitiers, 1950.** *France. Ministère de l'Air, Publications Scientifiques et Techniques*, Nos. 248, 250, 251, 261, 263, publ. **1951–1952.** 5 v. illus., tables, bibliogs. throughout, eqs. **DWB**—In publication No. 251, about 30 papers on various aspects of fluid mechanics which were used at the 1950 colloquium in Poitiers are presented in final form according to 3 groupings. First are 6 papers on the effect of wind on buildings or structures and regulations which have been promulgated as a result of these and similar studies made in France, also studies of the effect of air currents on moving vehicles such as autos, motorcycles, streamlined trains and airplanes. A number of studies on liquid and gas movements in channels are given next, and, finally, a series of papers on statistical theory of turbulence (MARTINOT-SAGARDE, SACKMANN, CONOLET, ROCARD, BURGERS, BOSS, VERNOTTE and KAMPÉ DE FÉRIET) and several on measurement of turbulence in the atmosphere or laboratory (by GUIENNA, FAVRE and BASS). *Subject Headings:* **1. Turbulence conferences 2. Compendiums. I. Colloque International de Mécanique, Poitiers, 1950.**—*M.R.*

5.5–139 551.551:551.511

Friedman, Don G., **The height variation of lateral gustiness and its effect on lateral diffusion.** *Journal of Meteorology*, 10(5):372–379, Oct. **1953.** 8 figs., 6 tables, 11 refs., 3 eqs. **MH-BH**—Observations at 6 levels, 1.4–44 m, at Round Hill, Mass. are analyzed for different thermal conditions, afternoon lapse to evening inversion. A number of wind speed profiles and 10 minute sample runs are illustrated. Vertical distribution of lateral diffusion is calculated in terms of O. G. SUTTON's virtual diffusion coefficient. The values found for this coefficient are larger than SUTTON's and are considered to be more accurate. *Subject Headings:* **1. Wind structure 2. Eddy diffusion.**—*C.E.P.B.*

5.5–140 551.551:551.506.5

Gandin, L. S. and Dubov, A. S., **Kompleksnaia ekspeditsiia 1947 goda po izucheniiu atmosfernoĭ turbulentnosti.** [The complex expedition of 1947 for the study of atmospheric turbulence.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, 16(78):5–9, **1949.** 4 figs. append. p. 136–143. **DLC**—A series of observations, devoted to all aspects of atmospheric turbulence, was made at the station Dolgoprudnaia (near Moscow) in order to test theoretical formulas proposed by BUDYKO, LAĬKHTMAN, ERTEL and others. This paper serves as an introduction to 11 papers, published in the same volume, and describes the general conditions of the expedition, the program of measurements and the location of instruments. The appendix presents profile data for temperature (surface, 0.2, 0.55, 20 m), and data for the

radiation balance and weather conditions. The time distance is 20 min (for 15 days,, but the conditions during the night are not covered. *Subject Headings:* **1. Micrometeorological profiles 2. Turbulence research 3. Dolgoprudnaia Station, Moscow District, U.S.S.R.**—*A.A.*

WIND

See also: **Seasonal monsoon forecasting** (Normand), 5.5–57; **Frequency of simultaneous occurrence of specified temp. and wind conditions** (Portugal. Met. Serv.), 5.5–124; **Development of the Coriolis principle** (McDonald), 5.5–132; **Theory of updraft connected with moazagotl cloud** (Wippermann), 5.5–150.

5.5–141 551.552:551.43(46)

Ward, A., **Wind direction at North Front, Gibraltar.** *Meteorological Magazine*, London, 82(977):322–330, Nov. **1953.** 2 figs., 8 tables, 8 refs. **MH-BH.** Also: Slater, A. E., **Winds at Gibraltar runway.** *Aeroplane*, London, 82(2124):410, April 4, **1952. DLC**—1) A description is given of the anemometer observations at the station (north of the Rock) with percentage frequencies of winds at surface, 2000 and 5000 ft. At surface 37% of winds are easterly and 36% westerly. Weather is closely related to surface wind; times of changes W–E and E–W are tabulated. The diurnal variation of strength of E winds is tabulated and found to have little relation to changes of pressure distribution. 2) Sums up article by R. S. Scorer: "Mountain-gap winds: a study of surface wind at Gibraltar" *(see item* No. 3.4–175 in April 1952, *MAB*). *Subject Headings:* **1. Local winds 2. Orographic effects 3. Gibraltar. I. Slater, A. E.**—*C.E.P.B.*

5.5–142 551.553.11

Loveridge, E. F., **A comparison of the wind velocity at the West Pierhead Light Station with the Weather Bureau Station at Oswego, New York.** [Dec. **1951**] 5 p. figs., graphs, 4 tables. Typescript. **DWB**—Records show that winds more than 25 mph are 60% greater ¾ mile off the entrance to Oswego Harbor (68 ft above water) than they are about ½ mile inland (131 ft above water). Data for occurrence of gale strength winds, direction, and velocities at the two stations are tabulated. *Subject Headings:* **1. Wind velocity 2. Wind data 3. Oswego, N. Y. 4. Lake Ontario. I. U. S. Weather Bureau.**—*M.P.K.*

5.5–143 551.553.12(234.3)

Gressel, W., **Eine für das Alpengebiet charakteristische Zirkulation.** [A circulation characteristic of the Alpine region.] *Meteorologische Rundschau*, 6(7/8):131–133, July/Aug. **1953.** 3 figs., 3 refs. **DWB**—Southerly winds at Alpine marginal valley stations but not in Alpine foreland were associated with: 1) a high over Europe developing and moving east; 2) a depression advancing from Atlantic to Baltic; 3) local mountain winds with weak gradients. *Subject Headings:* **1. Mountain winds 2. Alps.**—*C.E.P.B.*

5.5–144 551.553.8:551.553.21(54)

*George, P. A., **Squalliness of monsoon showers at Juhu (Bombay).** *India. Meteorological Dept., Memoirs*, 29(3):89–102, **1952.** 5 plates, 8 tables. **DWB**—Autographic (and other) records are used to determine characteristics of 761 showers or squalls occurring between 1944 and 1948, including annual, monthly and diurnal variations, frequencies by months of squalls with various wind direction, duration, veering or backing, speed, peak gusts, increases in speed, pressure changes, etc. Numerous tables and charts are presented along with a critical evaluation of the data. *Subject Headings:* **1. Monsoon rains 2. Squalls 3. Bombay, India.**—*M.R.*

WIND EFFECTS

See also: **Sources of power: wind, volcanic heat, sun and tide** (Marshall), 5.5–117.

5.5–145 551.556:551.465

Francis, J. R. D., **A note of the velocity distribution and bottom stress in a wind-driven current system.** *Journal of Marine Research*, 12(1):93–98, **1953.** 4 figs., 4 refs. **DWB**—The shear stress of the wind on a water surface is sometimes found by measuring the slope of the

surface in a lake or wind tunnel. The stress on the bottom of the lake due to the return water current is an error term which has been variously estimated. An experimental method of determining the error is described, and the results indicate that it is but some 1½% of the wind stress. *Subject Heading:* **1. Wind driven currents.**—*Author's abstract.*

5.5–146 551.556:551.461.2(265)

Unoki, S., **On the upheaving effect of stationary and nonstationary winds upon sea level. (An investigation on meteorological tides in the neighbouring seas of Japan—3rd paper.)** *Meteorological Society of Japan, Journal, 2nd Ser.*, 29(10):336–346, Oct. **1951.** 4 figs., table, 5 refs. In Japanese; English summary p. 336. **MH-BH**—A detail study of the problem. The effect of the Coriolis force on the upheaval of water surfaces caused by wind seems to be great. *Subject Headings:* **1. Sea level variations 2. Wind effects 3. Western Pacific.**—*A.A.*

5.5–147 551.556.2:632.4

Schrödter, H., **Untersuchungen über die Wirkung einer Windschutzpflanzung auf den Sporenflug und das Auftreten der *Alternaria*-Schwärze an Kohlsamenträgern.** [Investigations of the effect of planting a windbreak on the flight of spores and the occurrence of black-mold on cauliflower seed cases.] *Angewandte Meteorologie*, 1(5):154–158, May **1952.** 2 figs., 12 refs. **DWB**—The possibility of decreasing infection by these wind-borne spores by planting windbreaks of maize was investigated by counting spores with konimeter. No conclusive results were found, but at times the number of spores behind a windbreak greatly exceeded those in the open. This is attributed to lee eddies. As the windbreaks gave better conditions for infection, the results were unfavorable. *Subject Headings:* **1. Windbreaks 2. Plant diseases.**—*C.E.P.B.*

5.5–148 551.556.2:551.461.2

Tomczak, Gerhard, **Die Einwirkung des Windes auf den mittleren Wasserstand der Deutschen Bucht vom 15. Februar bis 6. März 1951.** [The effects of the wind on the mean water level of the German bight from Feb. 15 to March 6, 1951.] *Deutsche Hydrographische Zeitschrift*, 6(1):1–17, **1953.** 8 figs., 4 plates, 3 tables, 18 refs. German, English and French summaries p. 1. **DWB**—Curves of water level at 12 coast and floating stations between Wilhelmshaven and Husum were corrected for pure tidal effects, the wind disturbances plotted and isolines drawn twice daily. These are compared with synoptic charts. The results are discussed in detail including effects of onshore and offshore winds; disturbances of the order of 100 cm were found and their progress is charted. Distant storm waves are not thought important. A pure barometer effect on Feb. 27–28 is examined. *Subject Headings:* **1. Wind effects 2. Storm tides 3. Water level variations 4. North Sea Coast, Germany.**—*C.E.P.B.*

UPPER AIR WINDS AND VERTICAL MOTION

See also: **Method of investigating clear air turbulence** (James), 5.5–32; **Using Radar AA No. 3 MK III for radiosonde and upper wind data** (Gupta, Ventikeshwaran), 5.5–55.

5.5–149 551.557:551.542.7

Gustafson, A. F. (*Hqs. Air Weather Service, Wash., D. C.*), **On anomalous winds in the free atmosphere.** *American Meteorological Society, Bulletin*, 34(5):196–201, May **1953.** 5 figs., refs. **MH-BH**—A study of the properties of several cases of "anomalous" winds found in connection with very large persistent deviations between actual wind streamlines and corresponding geostrophic wind streamlines during a study involving the approximation of upper winds from known pressure field data. "Anomalous" winds were identified directly by the relationship $V_2 \geqq 2V_g \cos\beta$ (derived from the equation of atmospheric motion in which friction effects are neglected) where V_g is geostrophic wind speed, β is angle of geostrophic deviation and V_2 is wind speed. The 700 mb streamline and contour analyses include a possible explanation of the origin of anomalous winds in that "due to very rapid local changes in the pressure gradient (as represented by strong isallobaric gradients), winds which formerly experienced strong pressure gradients find themselves in weaker ones." *Subject Headings:* **1. Anomalous winds 2. Stream lines 3. Pressure gradient.**—*I.L.D.*

5.5–150 551.558.1:551.555.9:551.576.1

Wippermann, Fr., **Zur Theorie des Aufwindfeldes der Moazagotl-Wolke.** [The theory of the updraft connected with moazagotl clouds.] *Germany. Deutscher Meteorologischer Dienst im Französischen Besatzungsgebiet, Wissenschaftliche Arbeiten*, 2:81–85, **1950.** 3 figs., eqs., 10 refs. French summary p. 85. **DLC**—Möller proposed a theory for the updraft contributing to the formation of moazagotl clouds (1947). He derived the mechanism of that updraft as a prolongation of the upward flow of air near the slope of a mountain. The author completes Möller's theory by introducing expressions accounting for increase of wind speed and shift of wind direction with height. The modified theoretical structure of the updraft is explained in diagrams. Observations appear to justify the author's interpretation. *Subject Headings:* **1. Moazagotl clouds 2. Moazagotl winds.**—*G.T.*

5.5–151 551.558.21

Barasoain Oderiz, José A. and Castans Camargo, Manuel, **The standing wave updraft.** Trans. by Edward L. Corton, Jr. of: **Ascendencia ondulatoria.** *U. S. Naval Ordnance Test Station, Technical Memorandum*, 215, [**1951**]. 33 p. 20 figs., eqs. Spanish original in: *Spain. Servicio Meteorológico Nacional, Publicaciones, Ser. A, Memorias*, No. 18, **1947.** **DWB**—An excellent summary of the practical and theoretical work done on the standing wave in Spain in which the results obtained by the use of aerographs on sailplanes to obtain the temperature, pressure, and humidity of the upper air in the wave are illustrated. The adiabatic chart obtained is a valuable record of the upper air situation during a wave outbreak. *Subject Headings:* **1. Standing waves 2. Spain. I. Corton, Edward L., Jr.** (*trans.*).—*M.P.K.*

5.5–152 551.551:551.558.21:629.13

Mason, Derek, **Hill standing waves and safety heights.** *Shell Aviation News*, 179:14–18, May **1953.** 5 figs. Also in: *Weather*, 9(2):45–55, Feb. **1954.** **MH-BH**—After a preliminary account of the lee waves, a flight over N. Spain on Dec. 18, 1952, is described, showing track of aircraft and probable streamlines, and surface, 700 and 300 mb charts. Altimeter errors due to local low pressure areas or temperature deviations are considered. Author concludes that 1000 ft clearance may be insufficient and gives a graph for estimating necessary increase. *Subject Headings:* **1. Lee eddies 2. Flight procedure.**—*C.E.P.B.*

5.5–153 551.558.21:797.5

Pickup, Allan, **Waving at the Long Mynd.** *Gliding*, London, 3(4):164–167, Winter **1952/53. DWB**—Personal account of a flight up to 14,500 ft (believed to be highest flight in wave lift from Long Mynd, near Liverpool, England). Details of flight times and heights are given and clouds encountered during the flight (cumuli, lenticular and wave clouds) are mentioned. *Subject Headings:* **1. Standing waves 2. Gliding 3. Convective clouds 4. Long Mynd, England.**—*G.T.*

AQUEOUS VAPOR AND HYDROMETEORS

EVAPORATION

See also: **Evaporation measurement by radiosonde** (Geneve), 5.5–31; **Temp. and humidity, Palestine** (Ashbel), 5.5–126; **Evaporation from water surfaces** (Lapworth), 5.5–158.

5.5–154 551.57

Reichel, E., **Der Wasserhaushalt in Europa.** [The water balance in Europe.] *Umschau*, 53(22):677–680, Nov. 15, **1953.** 3 figs., 4 refs. **DWB**—The three terms Rainfall = Runoff + Evaporation are shown in annual charts for Europe, and the causes of their distributions discussed briefly. *Subject Headings:* **1. Rainfall 2. Evaporation 3. Runoff 4. Europe.**—*C.E.P.B.*

5.5–155 551.571:632.9:633.491

Bourke, P. M. Austin, **Potato blight and the weather; a fresh approach.** *Eire. Meteorological Service, Technical Note*, No. 12, Jan. **1953.** 11 p. refs. **DWB**—A new set of

criteria was developed, based on controlled laboratory experiments on the environment favorable to the development of the fungus *Phytophthora infestans* causing considerable loss in yield of potatoes. Criteria consider duration of humid spells with a relative humidity ≧90% and minimum temperature ≧50°F. Hourly observations are necessary for an efficient warning service. *Subject Headings:* **1. Plant diseases 2. Potato blight 3. Potato blight weather.**—*A.A.*

5.5–156 551.571

Erdélyszky, Zsigmond, **Tetens empirikus képletének elméleti levezetése.** [Theoretical derivation of Tetens' empirical formula.] *Időjárás*, 56(11/12):353–356, Nov./Dec. **1952.** 2 refs., 6 eqs. **DLC**—According to TETENS' formula $\log E = \frac{t \cdot b}{t+a} + c$, where E=saturation vapor pressure, t=temperature of the system (in °C) and a, b, and c are constants. The author derives theoretical values of a, b, and c over water and over ice and compares the obtained values with those determined by TETENS by empirical means. In the range −40°C to +40°C the difference between the author's E values and those obtained by TETENS' formula is not more than 4–5%. *Subject Headings:* **1. Vapor pressure formulas 2. Saturation vapor pressure.**—*G.T.*

5.5–157 551.571:620.19(54)

Hudson, J. C., **The Delhi pillar.** *Nature*, London, 172(4376):499–500, Sept. 12, **1953.** 2 tables. **DWB**—The freedom from rusting of iron pillar at Delhi, 1500 years old, is attributed to dryness of air and smallness of sulphur pollution. Humidity and rainfall data given for 1951. *Subject Headings:* **1. Corrosion 2. Humidity 3. Delhi, India.**—*C.E.P.B.*

5.5–158 551.571:551.573

Lapworth, Charles F., **Parowanie na powierzchni wody.** [Evaporation from water surfaces.] *Przegląd Geograficzny*, Warsaw, 21(1/2):77–82, **1947.** graphs. In Polish. **DLC**—The results of experiments on evaporation from water surfaces described in this paper and conducted by the author during 1936–1938 at Kew Observatory and Camden Square in London are particularly important, because too much "climatic" significance has been attached recently to the meteorological factor known as "saturation deficit," and this especially in questions concerning plant ecology. *Subject Headings:* **1. Evaporation measurements 2. Saturation deficit 3. Plant ecology.**—*A.M.P.*

CLOUD PHYSICS

See also: **Counting sodium-containing particles in atmos. by their spectral emission in hydrogen flame** (Vonnegut, Neubauer), 5.5–83; **Forms of ice crystals in air** (Itoo), 5.5–181.

5.5–159 551.574:536.421

Hosler, Charles L. and Hosler, C. Robert, **An investigation of the spontaneous freezing point of small quantities of water.** Pennsylvania. State College. Mineral Industries Experiment Station. Div. of Meteorology, Contract AF19(604)-140, Scientific Report No. 1, Aug. **1952.** 30 p. 6 figs., 31 tables, 25 refs. **DWB**—Experiments conducted with water in capillary tubes for the purpose of discovering the mechanism of supercooling in clouds are described. Freezing temperature was found to decrease with the decrease of the capillary diameter, which is attributed to changes in the water's atomic structure. Various methods of overcoming this barrier to the formation of ice crystals are discussed. Details of the experiments are tabulated, including data collected from earlier investigators. A curve of spontaneous freezing temperature versus capillary or drop diameter is presented. *Subject Headings:* **1. Freezing point of water 2. Freezing temperatures 3. Supercooled water. I. Pennsylvania. State College. Mineral Industries Experimental Station. Div. of Meteorology II. Contract AF19(604)-140.**—*G.T.*

5.5–160 551.574:536.421

Pound, G. M.; Madonna, L. A. and Peake, S. L. (*Carnegie Inst. of Tech. Metals Res. Lab.*), **Critical supercooling of pure water droplets by a new microscopic technique.** Carnegie Institute of Technology. Metals Research Laboratory, Contract AF19(122)-185, Scientific Report, No. 1, Dec. 1, **1952.** 11 p. 5 figs., 19 refs. **DWB**—Very pure water droplets of 10 to 50 microns in diameter were condensed in silicone oil to form an emulsion. A portion of this emulsion was placed on the specially designed cold stage of a Bausch and Lomb Research Metallograph and cooled to a low temperature. Temperature of the emulsion was measured by a small thermocouple, and freezing of the droplets was detected by observation with polarized light. The supercooling that is critical for ice formation was observed to be -40 ± 2°C, in agreement with the results of SCHAEFER and of CWILONG. There was usually no marked change in shape of the droplets upon solidification. *Subject Headings:* **1. Supercooled water 2. Freezing of water. I. Carnegie Institute of Technology. Metals Research Laboratory II. Contract AF19(122)-185.**—*Authors' abstract.*

5.5–161 551.574.1

Aliverti, Guiseppina and Lovera, Guiseppe, **Sui nuclei di condensazione de origine marittima.** [Condensation nuclei of marine origin.] *Geofisica e Meteorologia*, Genoa, 1(2/3): 33–35, March/June **1953.** 6 refs. **MH-BH**—A general discussion of old and new methods of measuring condensation nuclei: namely, those of OWENS, AITKEN, ZEISS, WILSON and, finally, DESSENS, KÖHLER and CHAPMAN. The latter methods allow the accurate measurement of the actual number and size of NaCl particles or the number of ions in sea salt laden air. *Subject Headings:* **1. Saline nuclei 2. Condensation nuclei measurement.**—*M.R.*

5.5–162 551.574.1:551.576.1

Arabadzhi, V. I., **O prichinakh kluboobrazovaniia.** [On the causes of puff formation.] *Meteorologiia i Gidrologiia*, No. 8:27–28, **1952.** 3 refs., 5 eqs. **DLC**—N. E. ZHUKOVSKII assumed that smoke-puff formation by a chimney stack depended on periodical pressure variations originated by smoke escape. The frequency of oscillations in this case can be determined from the equation $W=\sqrt{\frac{k}{m}}$; where k is elasticity of resonance medium, and m is the mass of air oscillating inside the resonator. The popular resonance theory helps to determine the vertical size of smoke-puff, which can be calculated by the equation $Z=\frac{2\omega\lambda}{c}\sqrt{\frac{lv}{q}}$; where Z is vertical size of puff, λ is velocity of smoke, c—velocity of sound, l—height of resonator mouth, v—volume of resonator, q—square cross section of resonator mouth. The calculation of frequency by the formula gives the frequency 2–3 hertz, which is in a good agreement with experiments. The formula shows that vertical size of the puff varies with the puff volume, velocity current, and height of resonator mouth, and can be used for cases of puff formation in clouds, where analogous relations are observed. If we take into consideration the following values of the equation members ($l=10$ m, $q=10^4$ m^2, $v=10^{10}$ m^3, $c=1.10^2$ m/s, $\lambda=1$ m/sec) which are realized approximately in natural cloud formation, then Z will be equal to 60 m, i.e., to the value usually observed in well developed cumulus clouds. *Subject Headings:* **1. Cloud physics 2. Cumulus clouds.**—*N.T.Z.*

5.5–163 551.574.1

†Havens, Barrington S., (*comp.*) (*Gen. Elect. Res. Lab.*), **History of Project Cirrus.** *General Electric Research Laboratory, Schenectady, N. Y., Report*, No. RL-756, July **1952.** 103 p. tables, 93 refs. p. 95–103. **DWB**—Covers the work of "General Electric" scientists in the "research study of cloud particles and cloud modifications," starting in 1940 (study of smoke particles) up to the establishment of the Project Cirrus in Feb. 1947, and the activities under this contract up to its termination in 1952 (instrumentation, laboratory studies on ice nuclei, silver iodide, raindrops, condensation nuclei, electrical phenomena, etc., cirrus, stratus and cumulus studies, flight tests, hurricane and forest fire studies); Actual discovery of the effect

of dry ice or other cold materials on the nucleation of supercooled cloud particles in July 1946 by SCHAEFER; Critical temperature for nucleation was found to be $-38.9°C \pm 0.1$; Discovery of the effect of silver iodide smoke by VONNEGUT in the fall of 1946; Theoretical calculations made by LANGMUIR; First cloud seeding on Nov. 13, 1946 (SCHAEFER); Discovery of dry ice effect on clouds having temperatures above the freezing point (LEOPOLD and HALSTEAD 1947) which resulted in the rain chain reaction theory of LANGMUIR. *Subject Headings:* **1. Cloud seeding research 2. Project Cirrus. I. Contract DA-36-039-sc-15345 II. General Electric Research Laboratory III. Langmuir, Irving IV. Schaefer, Vincent J. V. Vonnegut, Bernard.** —*A.A.*

FOG

See also: **Fog forecasting, Calcutta** (Basu), 5.5–60.

5.5–164 551.575:551.588.6

Yosida, Zyungo, **General survey of the studies on fog-preventing forest.** (In: Sapporo, Japan. Hokkaido University. Institute of Low Temperature Science, **Studies on fogs in relation to fog-preventing forest. 1953.** p. 1–23. 7 figs., refs.) **MH-BH**—In this introductory paper to the studies on the role of forest in the prevention of advection fogs carried out by the Institute of Low Temperature Science, Hokkaido University, the author summarizes briefly the data and conclusions of the individual studies. The review covers the following subjects: frequency of fog occurrence, description of observation areas, instrumentation and procedure, the fog meter, the role of atmospheric temperature and turbulence in relation to the fog prevention action of forests, and the capture effect. *Subject Headings:* **1. Advection sea fog 2. Fog prevention 3. Forest influences 4. Atmospheric turbulence 5. Hokkaido, Japan.**—*I.L.D.*

5.5–165 551.575.1:551.588.6

Huzioka, Tosio; Tabata, Tadashi and Matsumura, Nobuo, **The distribution of fog water content in the surroundings of a forest.** (In: Sapporo, Japan. Hokkaido University. Institute of Low Temperature Science, **Studies on fogs in relation to fog-preventing forest. 1953.** p. 204–220. 10 figs., 3 tables, 14 refs.) **MH-BH**—The fog water content in the vicinity of a forest was studied by means of automatic fog meters. Phase differences were observed among the temporal variations in fog water content; the relative phase shift at two different heights near the top of the forest is exceptionally large in comparison with those among other points near and above the forest. Above the tree crowns the fog water content decreased at the rate of 16% per meter, while in the open it decreased at 2.3% per meter. The fog water content at the top of the forest was 80% of that above the forest (2.7 m above the crown). The fog water content varied with periods as long as 2 hours. *Subject Headings:* **1. Water content of fog 2. Advection sea fog 3. Forest influences.**—*I.L.D.*

5.5–166 551.575.3

Kinosita, Seiiti, **The number of fog particles produced by natural adiabatic expansion of air.** (In: Sapporo, Japan. Hokkaido University. Institute of Low Temperature Science, **Studies on fogs in relation to fog-preventing forest. 1953.** p. 343–347. 3 figs., 3 refs., 2 eqs.) **MH-BH**—The cap cloud appearing on Mt. Nisekoan (1300 m.a.s.l.) in Hokkaido was studied in order to determine the degree to which increase in fog water content is due to variation in number of fog particles (n) per 1 cm^3 of air and in the mean mass of individual fog particles. Measurement of the number of cloud particles at the summit and base of the mountain showed that the number of fog particles remained the same but the fog water content (q) at the summit was more than four times that at the base. The change in q caused by adiabatic change of air mass is mainly due to change in mean mass of individual fog particles. The particle size distribution agrees with BEST's formula. *Subject Headings:* **1. Fog particle variations 2. Fog density 3. Advection sea fog 4. Forest influences 5. Hokkaido, Japan.**—*I.L.D.*

CLOUDS

See also: **Measurement of infrared transmission through clouds . . .** (Sadowski), 5.5–122; **Theory of updraft connected with moazagotl cloud** (Wippermann), 5.5–150; **Causes of puff formation** (Arabadzhi), 5.5–162.

5.5–167 551.576.1:551.515.8

Arch squall. *Marine Observer*, 22(157):123, July **1952.** photo. **DWB**—An excellent photograph of an isolated squall cloud in 52°N, 53°40′W on July 14, 1951, with accompanying weather. *Subject Headings:* **1. Line squalls 2. Roll clouds 3. Cloud photographs.**—*C.E.P.B.*

5.5–168 551.576.1

McCarty, Jerry, **Know the meaning of clouds and improve your weather guess.** *Maine Coast Fisherman*, Portland, Maine, 7(8):23–25, March **1953.** photos, diagrs. **DWB**—The mechanism of cloud formation is discussed and explained by schematic diagrams. Cloud types are described and illustrated in photographs with annotations indicating weather phenomena they represent. Interactions between meteorological factors and the action of the sea are also discussed. *Subject Headings:* **1. Cloud classification 2. Cloud formation 3. Cloud photographs.**—*G.T.*

5.5–169 551.576.4:551.591(469.9)

*Portugal. Serviço Meteorológico Nacional, **Frequency of simultaneous occurrence of specified conditions of ceiling and visibility at Lajes Airport.** *Portugal. Serviço Meteorológico Nacional, RT* 125, MEM 22, May 25, **1953.** 1 p. table. Also in its *Memorias*, v. 11, **1953. DWB**—Monthly frequency of (A) ceiling <500 ft and/or visibility <1 mile; (B) ceiling ≥1000 ft with visibility ≥3 miles and (C) all other conditions than (A) and (B) at Lajes Airport on Santa Maria in the Azores. Data furnished by the U. S. Air Weather Service. *Subject Headings:* **1. Ceiling and visibility data 2. Lajes Airport, Azores. I. U. S. Air Weather Service.**—*M.R.*

PRECIPITATION

5.5–170 551.577.11:551.577.2

Schirmer, Hans, **Über die räumliche Struktur der Niederschlagsverteilung.** [On the space structure of rainfall distribution.] *Annalen der Meteorologie*, 5(7/12):248–253, **1952.** 4 figs., 12 refs. Discussion p. 253. **MH-BH**—Daily charts of rainfall show streaks of heavy rain 5–15 km wide and sometimes >100 km long. Tracks of these in central Franconia in summers 1947–49 are plotted. This led to a new type of rainfall chart, showing a series of maximum zones, which were confirmed by close examination of annual rainfall means, 1891–1930. *Subject Headings:* **1. Precipitation streaks 2. Rainfall distribution 3. Franconia, Germany.**—*C.E.P.B.*

5.5–171 551.577.2:551.579(6)

†Drouhin, Georges (*Service de la Colonisation et de l'Hydraulique, Algérie*), **The problem of water resources in North-West Africa.** (In: UNESCO, **Reviews of Research on Arid Zone Hydrology. 1953.** p. 9–41. 36 refs.) **DWB**—The important feature of this paper for the climatologist is the new annual rainfall map of North Africa (period 1926–50) prepared by Dubief. The map covers the areas up to 25°E and 3°N in a scale of approx. 1:11,000,000 (no grid of coordinates) and shows also the hydrologic basins for which rainfall totals are computed. A summary of hydrologic research is given for each single administrative area and observational methods in arid regions are outlined. The bibliography gives a limited cross section of the available literature. *Subject Headings:* **1. Hydrologic research 2. Rainfall charts 3. Arid zones 4. Northwest Africa. I. Dubief, Jean.**—*A.A.*

5.5–172 551.577.2:591.9:599.2(946)

Guiler, Eric R., **Distribution of the brush possum in Tasmania.** *Nature*, London, 172(4389):1091–1093, Dec. 12, **1953.** 2 figs., 2 tables, 4 refs. **DWB**—The distribution of the black and grey varieties of *Trichosurus vulpecula* in 1949 is compared with annual rainfall. The percentage of black increases with increase of rainfall from below 30 to above 40 inches

and with increase of humidity. *Subject Headings:* **1. Rainfall distribution 2. Marsupials 3. Tasmania.**—*C.E.P.B.*

5.5–173 551.577.2(729) 551.577.3:551.513(729)

Howell, Wallace E., **A study of the rainfall of Central Cuba.** *Journal of Meteorology*, 10(4):270–278, Aug. **1953.** 14 figs., 5 tables, ref. **MH-BH**—Monthly and annual rainfall pattern in Cuba (shown by charts) is related to circulation pattern. Daily weather charts 1946 through 1950 classified into 9 types and 4 sub-types, with surface, 1000 and 10,000 ft wind, thermal stability and pressure change were punched on cards and a number of relations with rainfall index in central Cuba tabulated. These are analyzed. *Subject Headings:* **1. Rainfall charts 2. Rainfall variations 3. Cuba.**—*C.E.P.B.*

5.5–174 551.577.2(791)

Jurwitz, Louis R. (*U.S.W.B., Phoenix, Ariz.*), **Arizona's two-season rainfall pattern.** *Weatherwise*, 6(4):96–99, Aug. **1953.** 5 figs. **MH-BH**—Notes on the general climate of Arizona followed by a more detailed discussion of synoptic conditions giving rise to heavy local rains in parts of the state. The record summer season rainfalls occur as an aftermath of hurricanes moving into Mexico and dissipating but allowing deep columns of moist air to flow across Mexico into Arizona, or to tropical cyclones moving NE from Lower California. Winter rains are more general and occur when frontal systems move east from the Pacific off California—especially from Southern California coastal region. *Subject Headings:* **1. Rainfall distribution 2. Arizona.**—*M.R.*

5.5–175 551.577.2(791)

*Jurwitz, Louis Roy, **Rainfall in Arizona.** [1952?] p. 104–116 (collection or serial not indicated). 3 figs. Mimeo. **DWB**—Causes and distribution of rainfall and intensity at certain stations are discussed and illustrated by isohyetal charts and selected tabular data. Four types of rainfall occur in Arizona—the northwesterly type (lows from the Pacific Northwest) which gives light precipitation; the southwesterly type (lows coming from California) which gives moderately heavy winter rains; or the summer thunderstorm type, where the moisture supply comes from the Gulf of Mexico, and the hurricane type, which accompanies decaying tropical cyclones crossing Mexico and entering the Arizona region—the last type gives the most intensive rainfalls. Annual precipitation averages from 3.12 inches to 25.25 inches; the mean for the state being 13.9 inches; heaviest in mountains and driest in the Yuma Valley. Thus most of the state is arid. *Subject Headings:* **1. Precipitation data 2. Rainfall distribution 3. Precipitation sources 4. Arizona.**—*M.R.*

5.5–176 551.577.2(45)

*Mennella, Cristofaro, **L'Andamento pulviometrico dei decennio 1941–1950 nei suoi riscontri storici.** [The variation of precipitation during the decade 1941–1950 in historical retrospect.] *Società Geografica Italiana, Rome, Bollettino, Ser. 8*, 5(2):89–94, March/April **1952.** tables. refs. English summary, p. 94. **DWB**—Ten year averages of the winter (Sept.–Feb.) and summer (March–Aug.) rainfall over a period of 130 years and the annual seasonal precipitation for the period 1941–1950 have been calculated for the cities of Milan, Padua, Rome, Naples and Palermo and are presented in tables. A comparison of the march of rainfall over the past 130 years indicates an increasing drought; and this trend is manifested in the decade 1941–1950 except in the last year. *Subject Headings:* **1. Precipitation variations 2. Precipitation trends 3. Long period records 4. Italy.**—*I.L.D.*

5.5–177 551.577.2(261.2:4)

Prager, Erwin, **Der Niederschlag auf See und an der Dünenflachküste.** [Rainfall at sea and on flat coasts.] *Annalen der Meteorologie*, 5(7/12):259–267, **1952.** 9 figs., 6 refs. Discussion p. 267. **MH-BH**—Rainfall stations in Holland and NW Germany and off-shore divided into: A lightships, B low coasts, C inland. Annual sums mm/month: A 39, B 65, C 59, winter proportion greatest at B. Raindays A 11.7, B 15.2, C 16.0. Mean daily max/month, A 10.8, B 15.5, C 15.4. Annual and half-year maps drawn. Causes are discussed

ction predominates, most favorable situation a warm front or occlusion over shore. *Subject eadings:* **1. Rainfall distribution 2. Coastal rainfall stations 3. Netherlands 4. Northwest ermany.**—*C.E.P.B.*

SNOW

See also: **Snow and avalanches, winter 1950/51,** 5.5–2.

5.5–178 551.578.4:001

Schaefer, V. J., Klein, G. J. and de Quervain, M. R., **Entwurf einer internationalen hneeklassifikation ausgearbeitet durch das Komitee für Schneeklassifikation.** [Scheme an international snow classification prepared by the Committee for Snow Classification.] *U.G.G. International Association of Scientific Hydrology, Brussels, 1951,* [*Transactions*], 129–141, **1952.** tables. **DWB**—Detailed definitions for the classification and measurement solid precipitation, rime and snow cover (density, moisture content, form and size of grains, echanical properties, temperature, height and distribution). DE QUERVAIN gives supplemenry definitions for the state and form of the snow surface, trafficability, proposals for a more tailed classification of solid precipitation and explains the use of the snow code. *Subject eadings:* **1. Snow classification 2. Snow codes 3. Definitions.**—*A.A.*

5.5–179 551.578.4:551.501.6

Smith-Johannsen, Robert, **Snow data.** *I.U.G.G. International Association of Scientific ydrology, Oslo, 1948,* [*Transactions*], 2:153–156, [**1949**]. 3 figs. **DWB**—Snow data chart d code presented, which would make information needed by logging operation, resort owners, ghway, railway or military engineers more easily usable. *Subject Headings:* **1. Snow data arts 2. Industrial meteorology.**—*M.R.*

5.5–180 551.578.4

U. S. Snow, Ice and Permafrost Research Establishment, **Simplified field classification natural snow type for engineering purposes.** [Wash., D. C. Govt. Print. Office] Dec. 52. 1 p. $4\frac{1}{2}''\times6''$ (fold.). **DWB**—This pocket card shows signs with short explanations the grain nature, the hardness and wetness of snow, based on the "Draft of an international ow classification" presented at the Brussel's meeting of the I.U.G.G. *Subject Heading:* **Snow classification.**—*A.A.*

5.5–181 551.578.41:551.574.1

Itoo, K., **Forms of ice crystals in the air.—Size, mass and some other properties of ice ystals in the air. (On small ice crystals. Parts 2 and 3.)** *Papers in Meteorology and Geoysics,* Tokyo, 3(3,4):207–216, 297–306, Jan., March **1953.** 14 figs., 6 tables, 6 plates, 8 refs. **H-BH**—In Pt. 2 a detailed geometrical analysis of the hexagonal twin prism, hexagonal ism, hexagonal plate and seven miscellaneous forms of ice crystals is offered in text and agrams. Microphotographs of these crystals are appended. The equipment used (microope, light source, film) and the method applied in obtaining the pictures are described. . 3 gives further details of the microphotographic study, viz. size, thickness, mass and equency of the different ice crystals, their space density, the sizes of enclosed air bubbles, hesive properties, sublimation, composition, symmetry, etc. The difference between ice ystals in the air and snow crystals is discussed and illustrated. *Subject Headings:* **1. Ice ystals 2. Ice crystal formation 3. Microphotographs.**—*G.T.*

5.5–182 551.578.41

Yosida, Zyungo and Kozima, Kenzi, **Change in shape of snow crystals, I.** *Low Temrature Science,* Sapporo, Japan, v. 5:75–83, **1950.** 7 figs., 4 refs. In Japanese; English mmary p. 83: **DWB**—Snow crystals observed by microscope as they change shape in mosphere saturated with water vapor. A dendritic crystal became an assemblage of short rods. Optic axis of a crystal retained its original direction in spite of a great change in ystal shape. A snow crystal dipped in an oil layer did not change shape at all. This shows at any change in shape of snow crystal is due to evaporation or condensation of water vapor. ocesses of change in shape of snow crystals subject to a temperature gradient and that of

cloud particles attached to a snow crystal were observed microscopically. *Subject Headings:* **1. Snow crystal growth 2. Snow crystal structure.**—*Authors' abstract.*

5.5–183 551.578.46:551.311.12

Hillischer, Hermann, **Methoden zur kartographischen Errechnung der Schneegrenze auf Gletschern und deren Anwendung auf die Pasterze (Grossglockner).** [Method of cartographic calculation of the snow boundary on glaciers and its application to the Pasterze (Grossglockner).] *Leben und Umwelt*, Aarau, 6(12):279–283, Sept. **1950.** fig. **DLC**—Short description of six methods of calculation: 1) so-called Gipfel (top) or geographical method determining the boundary as well as arithmetical mean of the snow tops; 2) orometric method presented by E. Richter and Brückner based on analysis of the relations between the regions of alimentation and extinction. Other methods as presented by Kurovwski Höfer, and Hess give different forms of mathematical analysis of relations between precipitation and glaciers. *Subject Headings:* **1. Glaciers 2. Snow line 3. Precipitation variations 4. Austria.**—*N.T.Z.*

5.5–184 551.501:551.578.4

*U. S. Soil Conservation Service, **Summary of snow survey measurements for the Colorado River Drainage Basin, 1936–1952 inclusive.** Issued by the Division of Irrigation Engineering, Soil Conservation Service and Colorado Agricultural Experiment Station, July **1952.** 40 p., mostly tables. Mimeo. **DWB**—Average snow depth and water content of snow tabulated by courses for one day each month during Feb.–May, for each year of record. Surveys were started in 1936. Location of each course described in detail. *Subject Headings:* **1. Snow surveys. 2. Water content of snow 3. Snow depth 4. Colorado River Drainage Basin I. Colorado Agricultural Experiment Station II. Blehm, Lois D.**—*M.R.*

HYDROMETEOROLOGY

See also: **Surface hydrology of Sahara** (Dubief), 5.5–3; **Water resources, NW Africa** (Drouhin), 5.5–171; **Water deficiency and arid zones, British colonies** (Dixey), 5.5–211.

5.5–185 551.579.3:551.2

Thorarinsson, Sigurdur, **Some new aspects of the Grimsvötn problem.** *Journal of Glaciology*, 2(14):267–275, Nov. **1953.** 10 figs., 14 refs. English and German summaries p. 267. **DLC**—The Grimur Lakes (Grimsvötn) are in a volcanic glacier region in Iceland. The glacier bursts out about every tenth year and floods the surrounding region; the bursts are often but not always associated with visible volcanic eruptions. Author considers that they are due to accumulation of water beneath the ice by subglacial melting through volcanic heat, and that the release of pressure causes the eruptions. In the 1940's the regime changed probably because of climatic amelioration. *Subject Headings:* **1. Glacial floods 2. Volcanoes 3. Iceland.**—*C.E.P.B.*

5.5–186 551.579.4:551.4

Affronti, Filippo, **Cause ed aspetti particolari dell'alluvione dell'ottobre 1951 sull'Italia meridionale e insulare.** [Causes and peculiarities of the floods of Oct. 1951 in southern Italy and the Italian islands.] *Rivista di Meteorologia Aeronàutica*, 12(4):18–25, Oct./Dec. 195[illegible] 4 figs., table, refs. Italian, French, English and German summaries p. 18. **MH-BH**—The general weather situation of the period Oct. 14–19, 1951 is analyzed with a view of determining the principal factors responsible for the transformation of a fairly common situation into a calamity affecting southern Italy and the islands. It is shown that perturbations of this kind are not new on the eastern side of Sicily, and that they are due to a peculiar contrast between a low in the central Mediterranean and a high in the eastern Mediterranean. The role of mountain relief in the formation of maximum rainfall in the Aetna and Hyblean mountain areas is described. *Subject Headings:* **1. Floods 2. Orographic effects 3. Italy.**—*Author abstract.*

5.5–187 551.579.4:551.526.8

Anderson, Ernest R. and Marciano, J. J., **Discussion of "A comparison of several heat and mass transfer networks of interest in water conservation" by H. F. Poppendiek and M. Tribus.** *American Geophysical Union, Transactions,* 32(6):931–932, Dec. **1951.** fig. Reply by Poppendiek, H. F. and Tribus, M., p. 931–932. **MH-BH**—In this brief discussion it is granted that an electrical network has value in water loss investigations if the process involved can be represented electrically with accuracy. As to the "balsa-wood float with an attached thermocouple under it" for measurements of water surface temperature, it is assumed that the method is dubious. In reply POPPENDIEK and TRIBUS regret their use of "electrical" in their abstract as it was their intention to emphasize network representation for field problems. The use of the "balsa-wood float" did not show the theoretically expected difficulties. *Subject Headings:* **1. Water conservation 2. Electric thermometers 3. Sea surface temperatures. I. Poppendiek, H. F. II. Tribus, M.**—*W.N.*

5.5–188 551.579.4

Burton, S. H., **The "chains" of Exmoor.** *Weather,* 7(11):334–336, Nov. **1952. MH-BH**—An account of the structure of Exmoor which caused rapid run-off of 9 in. of rain on Aug. 14–15, resulting in the disastrous Lynmouth flood. *Subject Headings:* **1. Flash floods 2. Exmoor, England.**—*C.E.P.B.*

5.5–189 551.579.4

*California. Dept. of Public Works. Div. of Water Resources, **Flood flows and stages in Sacramento and Northern San Joaquin Valleys, 1950/1952.** Oct. **1952.** 115 p. appends. photos, diagrs. (some fold.). 10+109 tables. **DWB**—Fourteenth report of a series presenting for the period 1913–1952 data on flood flow and stages. Report gives description of 109 stream gaging stations, daily gage heights of 112 stations and estimated daily mean runoff. *Subject Headings:* **1. Floods 2. Hydrologic data 3. Sacramento River, Calif. 4. San Joaquin River, Calif. I. Schulz, Walter G.**—*A.A.*

5.5–190 551.579.4:627.51

Davis, Ellsworth I. (*Corps of Engrs., U. S. Army War College, Carlisle, Pa.*), **Development of a flood-control plan for Houston, Texas.** *American Society of Civil Engineers, Proceedings,* v. 78, Separate No. 159, Dec. **1952.** 19 p. 10 figs., 4 tables. **DWB**—From more than 50 individual storms, three design storms were selected and a standard project storm derived in order to make plans for detention reservoirs. Isohyetal maps and peak flow data are presented. *Subject Headings:* **1. Flood control 2. Engineering meteorology 3. Houston, Texas.**—*A.A.*

5.5–191 551.579.4(794)

Ernst, Emil F., **The floods of Yosemite Valley.** *Yosemite Nature Notes,* 31(3):23–29, March **1952.** illus., tables. **DWB**—Account by various authors of floods which occurred during the second half of the last and the beginning of the present century are summed up in a narrative manner. The floods of 1937 and 1950 are described and data on water level, flow, temperature and precipitation presented. *Subject Headings:* **1. Floods 2. Yosemite Valley, Calif.**—*G.T.*

5.5–192 551.579.4:368.51

*†Foster, H. Alden, **Report on floods and flood damage.** Prepared for the Insurance Executives Association, by Parsons, Brinckerhoff, Hall and Macdonald. New York, April, **1952.** 108 p. 24 figs., 12 tables, 40 refs. **DWB**—A careful study and a good source of information on flood damage and flood probability from the point of view of insurance risk, showing in detail the theoretical basis of calculation. Mean annual direct and indirect loss from floods in U.S.A. over 400 million dollars. Reduction of insurance rates in areas covered by the U. S. Weather Bureau warning service, proposed. *Subject Headings:* **1. Flood damage 2. Flood forecasting 3. Insurance 4. United States.**—*A.A.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATOLOGY

5.5–193 551.58:008

Backheuser, Everardo (*Nat. Council of Geog., Brazil*), **Clima e civilização: teoria do grau de cultura.** [Climate and civilization: theory of the degree of culture.] *Brazil. Conselho Nacional de Geografia, Boletim Geográfico*, 9(101):483–491, Aug. **1951. DWB**—This is a chapter from "A estrutura politica do Brasil" which was published in 1926. Examining the expansion and displacement of cultural centers throughout history, and speculating on the future, the author deduces his "laws of the degree of civilization" according to which climatic conditions are secondary factors in the development of a region, and cultural and economical prosperity is determined by the degree of civilization at a given time. It is also demonstrated that "the geographical trajectory of civilization indicates (by extrapolation) that it is shifting toward the equator." *Subject Headings:* **1. Climatic effects 2. Civilization.**—*G.T.*

5.5–194 551.58:551.43:06(494)

Davos, Switzerland. Schweizerisches Forschungsinstitut für Hochgebirgsklima und Tuberkulose, **Tätigkeitsbericht 1949/1951, 1951/1952,** [Yearly report.] Publ. **1952, 1953,** 2 pieces. Reprints from: *Schweizerische Medizinische Wochenschrift*, Basel, 82(46,48), **1952,** and 83(6), **1953. DWB**—In addition to lists of members of the foundation board and of the scientific council, each of the three reports (for the business years 1949/50, 1950/51 and 1951/52, respectively) contains an account by the president and by the two section directors (W. MÖRIKOFER for the Physical-Meteorological Observatory; W. BERBLINGER for the Section of Pathological Anatomy and Bacteriology). The reports on physical meteorology include accounts of research, publications, lectures and progress in the fields of radiation measurement, climatology, bioclimatology, meteoropathology, construction and production of instruments, and public relations. *Subject Headings:* **1. Research institutes 2. Mountain climatology 3. Bioclimatology 4. Davos, Switzerland. Forschungsinstitut. I. Mörikofer, W.**—*G.T.*

CLIMATE OF PARTICULAR PLACES

See also: **Met. survey of Oak Ridge area** (U. S. Weather Bur.), 5.5–9.

5.5–195 551.582(56)

*Akyol, I. Hakki (*Geog. Inst., Istanbul Univ.*), **Türkiyede yeni meteoroloji rasatlari serisinin coğrafi neticeleri. I. Türkijede termik hususiyetler.** [Geographical implications of recent meteorological observations in Turkey. I. Thermal peculiarities of Turkey.] *Istanbul. Université. Coğrafya Enstitüt, Dergisi*, 1(1):2–58, **1951.** 11 tables, 28 figs., refs. In Turkish; French summary p. 55–58. **DLC**—Data on thermal characteristics of Turkey (such as sunshine duration, absolute and relative temperature, amplitude of temperature variations, degree of continentality, etc.) are presented in tables, graphs and charts and analyzed as to their correlation to geographic and orographic properties of the country. *Subject Headings:* **1. Climate of Turkey 2. Temperature data 3. Turkey.**—*G.T.*

5.5–196 551.582(45)

†Barbieri, Guiseppe, **Il Mugello. Studio di geografia umana, Cap. 1–3.** [Mugello. Study in human geography, Ch. 1–3.] *Rivista Geografica Italiana*, 50(2):89–133, June **1953,** 7 figs., photos., tables, 51 refs. Ch. 3, **Clima, acque e vegetazione.** [Climate, water and vegetation.] [To be continued.] **DWB**—A descriptive account of the climate, hydrography and of the vegetation is included in this human geography study of Mugello. A detailed description of the rainfall regime (table shows weather stations and mean annual rainfall), the temperature regime; the relationship of relief and climate, and climate and vegetation is given. *Subject Headings:* **1. Climate of Mugello, Tuscany 2. Human geography 3. Mugello, Tuscany.**—*I.L.D.*

5.5–197 551.582:8

Börgel Olivares, Raynaldo, **Estudio agrícola y humano de la communidad "Los Potreros."** [Agricultural and social study of the community of Los Potreros.] *Chile. Universidad*

Instituto de Geografía, Informaciones Geográficas, 2(3/4):114–125, Dec. **1952.** 4 figs. **DWB**—A brief paragraph on the climate of the region around "Los Potreros," in Santa Cruz Dept., Chile, is contained in this geographical study of the physiography, geology, vegetation, hydrology and agricultural development and possibilities of the region. Winter (May-Aug.) is the rainy season, with torrential rains predominant. Spring is totally dry, in fact the dry season lasts 6–8 months so that water for agricultural purposes must come from ample ground water sources. *Subject Headings:* **1. Climate of Los Potreros, Chile 2. Agricultural development 3. Los Potreros, Chile.**—*M.R.*

5.5–198 551.582(434.7)

*Dinkelacker, Otto Friedrich and Beyerlein, F., **Das Klima von Esslingen und Umgebung.** [The climate of Esslingen and district.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:34–41, **1952.** 4 figs., 13 tables. **DWB**—Climatic observations at Hohenheim 1876–1925 and Esslingen corrected to this period are tabulated and compared. Phenological data are included. *Subject Headings:* **1. Local climates 2. Esslingen, Württemberg.**—*C.E.P.B.*

5.5–199 551.582(421.9)

Hawke, E. L., **The climate of Hampstead Heath.** *Hampstead Scientific Society, London, Report*, 1947/48–1951/52:9–20. 6 tables. Mimeo. **GB-MO**—Monthly summary of means (1910–44) and extremes (1910–51) of temperature, rainfall and sunshine at 450 ft, the highest point in London. *Subject Headings:* **1. Local climates 2. Hampstead, London.**—*C.E.P.B.*

5.5–200 551.582:63(567)

Kellersohn, Heinrich, **Die Landwirtschaft in Irak.** [Agriculture in Iraq.] *Erdkunde*, 7(4):276–288, **1953.** 5 figs., 7 tables, 31 refs. English and German summaries p. 276. **DLC**—Opens with a section on climate with rainfall maps and table and diagram of monthly temperatures. Crop yields are low due to scanty rainfall and social shortcomings. Irrigation and reform of land tenure are both necessary. *Subject Headings:* **1. Agricultural climatology 2. Iraq.**—*C.E.P.B.*

5.5–201 551.582(431/5)

*Köster, Erhard, **Die Mecklenburgische Ostseeküste von Travemünde bis zum Darss, III. Das Klima** [and] **IV. Das Meer.** [The Mecklenburg Baltic Sea Coast from Travemünde to the Darss. III. The climate, [and] The sea.] *Geographische Rundschau*, Brunswick, 5(4):143–148, April **1953.** 2 figs., tables, bibliog. p. 148. **DWB**—Author discusses basic climatic data as well as salinity, sea temperature, ice conditions, currents, storms and earthslides for the Baltic coast of East Germany. *Subject Headings:* **1. Climatic data 2. Climate of the Baltic Coast 3. Baltic Coast 4. Mecklenburg, Germany.**—*A.A.*

5.5–202 551.582(914)

*Koh, Severino, **Climate of Butuan City. 15th of the series on Climate of cities of the Philippines.** *Philippines. Weather Bureau, The Elements*, 4(4):12, April **1953.** table. **DWB**—Monthly mean values of temperature (12-year records), rainfall and number of rainy days (37 years) and wind speed and direction (5 years) are tabulated and commented on. Butuan City, capital of Agusan Province in the eastern part of the Philippines has a climate characterized, among others, by the lack of a dry season and by a very pronounced rainy season. The monthly mean temperature varies between 77.2°F (Jan.) and 82.6°F (May). *Subject Headings:* **1. Local climates 2. Climate of Butuan City, Philippine Islands 3. Butuan City, Philippine Islands.**—*G.T.*

CLIMATIC CHANGES

See also: **Glaciology** (Drygalski, Machatschek), 5.5–4; **Secular change of equatorial front, air temp. and number of typhoons** (Matsukura), 5.5–116; **Summer heat in Berlin, 1766–1952** (Schulze), 5.5–128.

5.5–203 551.583.3/7

Jaranoff, Dimitri, **Das Klima des Mittelmeergebietes während des Pliozäns und des Quartärs.** [Climate of the Mediterranean Sea area during the Pliocene and Quaternary

eras.] *Geologische Rundschau*, Stuttgart, 34(7/8):435–446, Sept. 10, **1944.** table, 16 ref
DLC—A savannah followed by Mediterranean climate moved S from central Europe in Upp
Miocene to S. Mediterranean in Upper Pliocene, associated with shrinkage of desert bel
This might be due to a decreased solar constant slowing the thermodynamic circulatio
Climatic changes and cultural chronology dated 600,000 BC–1900 AD are tabulated in northe
Atlas and northern Balkans. Owing to pre-Wurm elevation the last glaciation was the mos
severe and no trace of Gunz can be found. In Mediterranean region climatic fluctuation
were less than further north, where a slight change in W wind affects a large area. *Subje*
Headings: **1. Geological climates 2. Quaternary climates 3. Mediterranean Area.**—*C.E.P.B.*

5.5–204 551.583.3:551.48

Lied, Herta, **Der Abfluss des Glogau-Baruth-Hamburger Urstromtals während d
Brandenburger Stadiums der Weichsel-Eiszeit.** [The outflow of the Glogau-Baruth-Hambur
original river valley during the Brandenburg stage of the Weichsel Ice Age.] *Petermann
Geographische Mitteilungen*, 97(2):89–96, **1953.** fig., 50 refs. **DWB**—An interesting discussio
of the climatology and hydrography of a primeval river flowing southwards from Scandinavi
Taking precipitation as 350 mm a year, ablation as 100 mm, area of melting 150,000 km² o
of a total area of 800,000 km² for the basin, annual outflow is calculated as 280 km³ wate
mostly in June–Aug. When the contribution of the rivers from the Mittelgebirge is adde
a primeval river as large as the Niger is found with a flow more than 40 times that of the prese
Elbe. *Subject Headings:* **1. Quaternary climates 2. Rivers 3. Europe.**—*C.E.P.B.*

5.5–205 551.583.3:551.

Lougee, Richard J., **A chronology of postglacial time in eastern North American.** *Scie
tific Monthly*, 76(5):259–276, May **1953.** 17 figs., 38 refs. **DLC**—Based on successive region
uplifts alternating with periods of stability, a succession of 12 stages is made out and used
correlate Great Lakes region with New York-New England-Arcadia. Ice limits in Ne
England are shown for each of the earlier stages, and sea levels in the later stages. A slo
rise of sea level (0.02 ft per year) is at present in progress, due to continued deglaciatio
Subject Headings: **1. Glacial periods 2. New England.**—*C.E.P.B.*

MICROCLIMATOLOGY

5.5–206 551.584.6:629.

Buettner, Konrad, **Heat and cold in aircraft.** (In: **German aviation medicine, Wo
War II.** Washington, D. C., Govt. Printing Office, **1950.** v. 2. p. 757–765. 2 figs.,
tables, 11 refs., 2 eqs.) **DWB**—The cabin "climate" of airplanes is considered as a function
air and wall temperature, solar radiation and wind. A device for measuring the percepti
of thermal climate, the "Frierkörper," which is a modification of Pfleiderer Frigorigraph
described and its use is illustrated. Temperatures encountered in airplane cabins duri
flight and means for obtaining physiological suitable temperatures are discussed. Conditio
in parked aircraft are considered. Methods for calculating cabin heating and insulation a
presented. Instructions for medical officers to secure protection against heat in aircr
and tents are outlined. *Subject Headings:* **1. Airplane cabin climates 2. Comfort clima
—*I.L.D.*

5.5–207 551.584.6:629.12.011.

Höller, Erich, **Neue Untersuchungen zur Laderaum-Meteorologie.** [New investigatio
into the meteorology of ships' holds.] *Annalen der Meteorologie*, 5(7–12):281–286, 19
Also: Macht, H. G., **Meteorologisch-physikalische Grundlagen der Belüftung und Klim
Steuerung von Schiffsladeräumen.** [Meteoro-physical bases of ventilation and clima
management of ships' holds.] *Ibid.*, p. 287–292. 4 figs., 3 refs. German and Engl
summaries p. 287. **MH-BH.**—Höller discusses "sweating" (condensation) as a problem
ventilation. Investigations in Germany were renewed in 1950 with examination of earl
data and observations with special instruments in holds; discussion of biological problem
in hand. The problem is complicated but air conditioning (Cargocaire) is costly. Mac
discusses theory on basis of constant rate of ventilation with inside and outside air at vari

temperatures and humidities, and production of heat and moisture by cargo. Accumulation of moisture in cargo itself is dangerous but can often be avoided by correctly designed ventilation. *Subject Headings:* **1. Climate of ships' holds 2. Cargo protection. I. Macht, H. G.**—*C.E.P.B.*

5.5–208 551.584.61

Murav'eva, G. I., **Konferentsiia molodykh nauchnykh sotrudnikov Instituta obshcheĭ i kommunal'noĭ gigieny AMN SSSR.** [Conference of junior scientific collaborators of the Institute of General and Communal Hygiene of the Academy of Medical Sciences of the U.S.S.R.] *Gigiena i Sanitariia*, Moscow, No. 6:39–86, June **1952. DLC**—Papers were presented on housing for the warm region of the U.S.S.R. and on determining the optimum microclimates of dwellings in the southern regions of the U.S.S.R., in particular in the area where the Principal Turkmen Canal is being built. Measures proposed were maximum irrigation and planting, planning houses with cross ventilation, orientation of buildings to prevailing wind, buildings with few stories, increased height of living quarters, protection of walls against radiational heat, ventilation, etc. Names of individuals presenting papers and topics of discussion are given. *Subject Headings:* **1. Indoor climates 2. Building design 3. U.S.S.R.**—*I.L.D.*

5.5–209 551.584.61

Reidat, Rudolf (*Met. Amt Nordwestdeutschland, Hamburg*), **Wetter, Bauwesen und Heizung.** [Weather, building and heating.] *Nachrichtenblatt für Technik und Wirtschaft im Hausbrand.* April **1952.** [5 p.] 8 figs. Abstracted from reprint. **DWB**—The relationship of solar radiation, cloudiness and wind velocity to heating of dwellings is discussed with special reference to Hamburg, Germany. The radiation (kg cal/m²) incident upon a south wall, east or west wall and a flat surface at 0°, 30°, 60° and 90° to the sun during the different seasons are shown graphically. The relationship between precipitation and wind direction and frequencies of wind velocities in Hamburg are shown graphically. Five year average of the deviation from the 100-year average heating period are shown on a graph. The relationship between degree days and heating is analyzed and it is shown that not only outside air temperature but also wind is an important factor in calculating heating requirements of houses. *Subject Headings:* **1. Indoor climates 2. Solar heating 3. Hamburg, Germany.**—*I.L.D.*

CLIMATIC CLASSIFICATIONS

5.5–210 551.585:525.5

Yaegashi, S., **A meteorological classification of season.** *Iwate Meteorological Association, The Review*, p. 27–29, Nov. **1951.** graph. In Japanese; English summary append. p. 4. **DWB**—Curves of secular mean daily values of temperature, precipitation, cloudiness and relative humidity at Morioka are constructed and found to show changes in the tendency of climatic development at ten points during the year. The year is accordingly divided into ten natural seasons applicable to the Morioka region. A brief description of each of these seasons is offered and the periods of their duration indicated. *Subject Headings:* **1. Climatic seasons 2. Climatic classifications.**—*G.T.*

5.5–211 551.585.55:551.579

Dixey, F. (*British Colonial Geological Surveys*), **Water deficiency areas and arid zones in the British colonies.** *I.U.G.G. International Association of Scientific Hydrology, Brussels*, 1951, [*Transactions*], 4:21–25, 35–45, **1952.** appendix. **DWB**—Short notes on the climate of the arid zones for each colony with a description of the work done to improve hydrologic conditions. *Subject Headings:* **1. Arid zones 2. Water conservation 3. British colonies.**—*A.A.*

5.5–212 581.03:551.585.55(47)

Voronov, A. G., **O perezimovanii travianistykh rasteniĭ.** [On the hibernating of grass plants.] *Botanicheskiĭ Zhurnal*, Moscow, 37(2):173–180, **1952.** refs. **DLC**—Observations made on the hibernation of a large number of species in the Kustanaĭsk region of Kazakhstan, characterized by a severe climate (large temperature range, short season only, without killing

frost, frequent droughts). *Subject Headings:* **1. Growing season 2. Kustanaĭsk Region, Kazakhstan.**—*A.A.*

BIOCLIMATOLOGY

5.5–213 551.586:612

Takács, Lajos, **A mikroklímáról.** [On microclimate.] *Természet és Technika*, Budapest, 111(11):697–699, Nov. **1952.** figs. **DLC**—Elements constituting sensible temperature are discussed and their effect is illustrated by examples taken from everyday life. The sensation of warm and cold in the human body is a composite reaction derived from air temperature, conductivity of the environment, atmospheric humidity, motion of the air, environmental and solar radiation, muscular exertion and clothing. Owing to the diversity of these factors it has not been possible as yet to develop a single instrument measuring sensible temperature, but such an instrument may be constructed in the future. An electric resistance thermometer for measurement in small spaces (between petals of a flower, for example) is shown in a photograph. *Subject Headings:* **1. Sensible temperature 2. Comfort climates 3. Micrometeorological instruments.**—*G.T.*

5.5–214 551.586:612:6

Walker, Ralph (*Voorhees, Walker, Foley & Smith*), **Practical aspects of tropical living.** [In: National Research Council, Wash., D. C. Building Research Advisory Board, Housing and building in hot-humid and hot-dry climates, Nov. 18–19, 1952, **Proceedings,** p. 3–5, **1953.**] Issued in pre-conference mimeographed form with title: **Building for the tropics. DWB**—A general discussion of some of the physical and psychological factors affecting comfort in the tropics. The author stresses the considerable climatic variations within small areas, the unapplicability of prefabricated housing, the consideration of psychological factors in planning for comfort, the control and utilization of prevailing winds and the need for studying effective wind control, glare and gloom in actual structures under laboratory conditions. *Subject Headings:* **1. Building design 2. Tropical climatology 3. Comfort climate.**—*I.L.D.*

5.5–215 551.586:612.014.4

†Buettner, Konrad, **Physical heat balance in man.** (In: **German aviation medicine, World War II.** Wash., D. C., U. S. Govt. Print. Off., **1950.** v. 2. p. 766–791. 10 figs., 5 tables, 46 refs., 21 eqs.) **DWB**—The physical processes of heat regulation of the human body are reviewed. With the aid of equations, the author discusses heat content and heat inertia, heat transmission by conduction, by advection and convection, by diffusion and evaporation and by radiation; resistance to heat and to diffusion; solar radiation and heat exchange including reflection and absorption by the body; and the surface area of the body in relation to heat exchange. The problem of a suitable climatic index which represents the combined effects of the climatic elements; namely, cooling rate, effective temperature, etc., and its use and validity are discussed. The actual application of the physics of heat regulation to describe water evaporation from the skin, the significance of humidity in heat balance, the temperature of the respiratory air, the cooling of the extremities in cold air and then freezing fast to cold metals are reviewed. *Subject Headings:* **1. Heat effects on man 2. Comfort indexes.**—*I.L.D.*

5.5–216 551.586:612.014.

Lee, Douglas H. K. (*Johns Hopkins Univ.*), **Significance of hot environments for man.** (In: National Research Council, Wash., D. C. Building Research Advisory Board, Housing and building in hot-humid and hot-dry climates, Nov. 18–19, 1952, **Proceedings, 1953.** p. 6–12. figs., table.) **DWB**—A nontechnical account of man's heat regulating mechanism and the manner in which it can be influenced by the environmental conditions of housing. The author summarized heat exchange with the surroundings through conduction, convection, evaporation and radiation; the radiational exchange of the body with its surroundings including the reflection and absorption of solar and black body radiation; the physiological consequences of failure of heat loss (heat stroke); the physiological heat regulating mechanism and individual variability in response to heat as influenced by age, health, nutrition, clothing, etc. Psychrometric charts on which are shown heat tolerance levels for men are given. *Subject Headings:* **1. Physiological climatology 2. Heat tolerance 3. Heat effects on man.**—*I.L.*

5.5–217 551.586:612.2

Mörikofer, Walter (*Phys.-Met. Obs., Davos, Switzerland*), **Meteorologische Gesichtspunkte zur Föhn- und Wetterfühligkeit.** [Meteorological aspects of föhn and weather sensitivity.] *Schweizerische Akademie der Medizinischen Wissenschaften, Basel, Bulletin,* 8(5/6):494–503, **1952.** 15 refs. German, French, Italian and English summaries p. 501–502. Abstracted from reprint. **MH-BH**—Various forms of weather sensitivity connected with föhn winds or frontal passages are described. The author tries to determine the meteorological element which acts directly on the human body. He refers in particular to the phenomena of distant sensitivity and pre-sensitivity and to the fact that weather sensitivity exists even in a closed room. There are only two known atmospheric phenomena—the author believes—which might account for such effects, namely variations in atmospheric electricity and sudden pressure changes. *Subject Headings:* **1. Weather sensitivity 2. Föhn effects.**—*G.T.*

5.5–218 551.586:612.2

Spangenberg, W. W., **Geruchsempfindungen in Abhängigkeit von atmosphärischen Vorgängen.** [Dependence of olfactory sensations upon atmospheric processes.] *Angewandte Meteorologie,* 1(6):170–172, June **1952.** 16 refs. **MH-BH**—The author discusses the phenomenon that particular atmospheric conditions are associated with characteristic olfactory sensations may be associated with: 1) variable stimulus intensity but constant sensitivity (increase in concentration of stimulus or variable weather processes), 2) variability of sensation with constant stimulus (change in sensation threshold caused by atmospheric phases) and 3) variability of both factors simultaneously. The literature dealing with this phenomenon is summarized and its association with various pathologic states influenced by weather namely rheumatic and post pleuritic pain and asthma is mentioned. The production of such olfactory sensations is due to 1) composition of respired air, 2) nonspecific stimuli and 3) false olfactory sensations (nervous and mental states). *Subject Heading:* **1. Weather sensitivity.**—*I.L.D.*

5.5–219 551.586:612.275

Takáts, István and Szénásy, József, **Két súlyos kórkép frontátvonulásokkal való kapcsolata.** [Connection of two serious syndromes with frontal passages.] *Időjárás,* 56(7/8):234–236, July/Aug. **1952.** 4 refs. **DLC**—The author recorded 187 cases of pregnancy eclampsia (1948–1950) and 95 cases of fatal dehydration and investigated their correlation with frontal passages. He gives a summary of his findings. In 62% of the cases recorded, eclampsia was found to occur during "biologically active periods" of frontal passages. When several cases accumulated within a short range of time, this usually occurred in conjunction with frontal passages. No significant correlation is found between death from dehydration and frontal passages. *Subject Headings:* **1. Frontal effects 2. Medical meteorology.**—*G.T.*

5.5–220 551.586:613

Ford, Norman D., **How to choose the perfect climate for you.** *Journal of Living,* New York, [v. 18, No. 8?], Feb. **1953.** p. 7–11. **DWB**—Practical suggestions are offered to retired persons who want to choose the optimum climate for their future residence. Best climates are located south and west of a line drawn across the country between San Francisco and the mouth of Delaware Bay and east (*sic*) of the Cascades-Sierras. Attention is called to a storm-track line across New Mexico which separates the placid climate south and west of it, from stormy regions to the east. Amount of sunshine and individual health condition are indicated as further elements to be considered. *Subject Heading:* **1. Climate and health.** —*G.T.*

ENVIRONMENTAL INFLUENCES

See also: **Fog-preventing forest** (Yoshida), 5.5–164; **Fog water content distribution around a forest** (Hugioka, others), 5.5–165.

5.5–221 551.588:63

Peirce, A. W., **Some problems of vitamin deficiencies of animals in Australia dependent on climatic factors.** (In: Specialist Conference on Plant and Animal Nutrition in Relation to Soil and Climatic Factors, Australia, 1949, **Proceedings.** Publ. **1951.** p. 352–357.)

DWB—The dependence of vitamin deficiencies upon climatic factors is concerned with large seasonal variations in the vitamin content of plants "whether these variations occur in an definite rhythm associated with regular seasonal changes or as irregularities such as a drought of unusual length." Seasonal changes in vitamin A and vitamin D content of forage crops are discussed. *Subject Headings:* **1. Climatic influences 2. Agricultural climatology 3. Vitamin deficiencies 4. Australia.**—*I.L.D.*

5.5–222 551.588.2:581.9(436)

Kielhauser, G. E., **Die Vegetation des Kaunerbergs als Ausdruck des dortigen extremen Klimas.** [The vegetation of Kauner Mountain as an expression of local extreme climate.] *Wetter und Leben*, 5(1/2):43–46, March **1953.** fig., 9 refs. **DWB**—The hygric continentality or the aridity index of Gams $\left(\text{the angle of the cotangent } \frac{\text{annual precipitation in mm}}{\text{elevation above sea level—m}}\right)$ is calculated and isolines are drawn for points of equal aridity on the mountain. An analysis of aridity and vegetation shows that: 1) xerothermal vegetation is determined by extreme local climatic conditions; 2) their orographic distribution corresponds fairly closely to the Gams isolines and 3) the xerothermal vegetation is composed chiefly of Mediterranean species and genera. *Subject Headings:* **1. Aridity index 2. Topographic effects 3. Phytogeography 4. Kauner Mountain, Austria.**—*I.L.D.*

SYNOPTIC CLIMATOLOGY

See also: **Hemisphere wide circulation patterns and type classification** (Lamb), 5.5–104; **Study of diurnal temp. changes** (Garnett), 5.5–127.

5.5–223 551.589(71):629.13

Cameron, Hugh and Thompson, C. E., **A few notes on weather in the Whitehorse region, Canada.** *Meteorological Div., Cir-2318*, TEC-155, June 30, **1953**; *Local Forecast Study*, No. 22, Whitehorse District. 16 p. 3 figs. **DWB**—Since orographic effects predominate in the Whitehorse region, this report commences with a discussion of general terrain features. The various air masses and fronts that affect the region are next described, for winter and summer conditions, and for low and high index situations. The weather associated with such synoptic states is described. Detailed remarks are given for the following routes and (for the terminals mentioned as well): Whitehorse-Aishihik-Snag, Whitehorse-Teslin-Watson-Lake, and Whitehorse-Juneau. Particular attention is paid to cloud systems, fog, icing, turbulence, and thunderstorms. *Subject Headings:* **1. Climate of Whitehorse District 2. Aeronautical climatology 3. Whitehorse, Yukon Territory.**—*Authors' abstract.*

MISCELLANEOUS APPLICATIONS

SOLAR INFLUENCES

See also: **Radio echo studies of meteor ionization** (Kaiser), 5.5–6.

5.5–224 551.590.25

Millman, Peter M., **The typical Perseid Meteor spectrum.** *Nature*, London, 172(4384):853–854, Nov. 7, **1953.** fig., table, 9 refs. **DWB**—A Perseid infrared spectrum photographed at Ottawa is reproduced. All Perseid spectra are similar and show lines of H, N, O, Na, Mg, Al, Si, Ca, Mn and Fe. *Subject Heading:* **1. Meteor trails.**—*C.E.P.B.*

5.5–225 551.590.25:621.396.81

Villard, O. G., Jr.; Peterson, A. M. and Manning, L. A., (*Radio Propagation Lab., Stanford Univ., Cal.*), **Extended-range radio transmission by oblique reflection from meteoric ionization.** *Journal of Geophysical Research*, 58(1):83–93, March **1953.** 3 figs., table, 7 refs. **DWB**—It has been found that radio communication between relatively low-power stations operating at 14 Mc and separated by distance of roughly 1200 km may be maintained at times when no layer transmission to any point on the earth's surface can be demonstrated to be present. Th

signal obtained is subject to considerable fading, but some signal is nearly always detectable. The contribution of overlapping oblique-incidence meteor reflections to the observed signal is considered in the light of some preliminary theoretical and experimental findings. It is clearly important to assess the meteoric contribution with care, since the possibility that meteoric reflections alone could account for the signal does not seem unreasonable. Suggestions for further investigation are given. *Subject Headings:* **1. Meteor trails 2. Radio wave propagation. I. Eshleman, R.**—*Authors' abstract.*

VISIBILITY

See also: **Measurement of infrared transmission through clouds . . .** (Sadowski), 5.5–122; **Frequency of simultaneous occurrence of specified conditions of ceiling and visibility** (Portugal Met. Serv.), 5.5–169; **Measurement of spectral scattering function of air near ground by good visibility, Smoke and fog** (Foitzik, Zschaeek), 5.5–228.

5.5–226 551.591(048.1)

Frith, R., **Review. Vision through the atmosphere. By W. E. Knowles Middleton. Toronto, University Press. London, G. Cumberle, 1952.** *Meteorological Magazine*, London, 82(978):377–380, Dec. **1953. MH-BH**—A long critical review. MIDDLETON's argument for abandoning marks and estimates in favor of instrumental observations is countered. The effect of absorption compared with scattering is also discussed. (For abstract of book *see item* 4.4–11, April 1953, *MAB.*) *Subject Headings:* **1. Visibility 2. Reviews. I. Middleton, W. E. K.**—*C.E.P.B.*

OPTICAL PHENOMENA

5.5–227 551.593.12 551.596.1

Obukhov, A. M., **O vliianii slabykh neodnorodnosteĭ atmosfery na rasprostranenie zvuka i sveta.** [The influence of weak atmospheric heterogeneities on the dispersion of sound and light.] *Akademiia Nauk SSSR, Moscow, Izvestiia, Ser. Geofiz.*, No. 2:155–165, **1953.** 11 refs., 30 eqs. **DLC**—A mathematical investigation of the problem dealing with the spread of waves in a medium characterized by a pulsating coefficient of refraction; this problem is particularly relevant to the theory of stellar scintillation and to various aspects of atmospheric acoustics. The problem is solved by means of linearization of equations which are satisfied by the phase and logarithm of the moving wave. By means of specific examples the author shows the applicability of approximate geometrical theory and the kind of correlations arising in the calculation of diffraction effects. *Subject Headings:* **1. Acoustical propagation 2. Scintillation.**—*I.L.D.* (*Trans. of author's summary*).

5.5–228 551.593.5:551.591:551.508.92

*Foitzik, Leonhard and Zschaeek, Helmut, **Messungen der spektralen Zerstreuungsfunktion bodennaher Luft bei guter Sicht, Dunst und Nebel.** [Measurements of the spectral scattering function of the air near the ground by good visibility, smoke and fog.] *Zeitschrift für Meteorologie*, 7(1):1–19, Jan. **1953.** 12 figs., 7 tables, 17 refs. **MH-BH**—Measurements of the scattering function made by means of a 150 cm parabolic mirror and a mercury high pressure lamp for three spectral intervals at different turbidities, show a good correlation with visibility. The scattering function can be characterized by means of the "direction ratio" between the forward and back scattering. Mean scattering function given for green and yellow, as well as data for the dependence of the direction ratio and the extinction exponent dependent on temperature, relative humidity, wind and air mass. *Subject Headings:* **1. Scattering of light 2. Visibility measurement.**—*A.A.*

5.5–229 551.593.5

Green and red flashes. North Atlantic Ocean. *Marine Observer*, 23(161):144–145, July **1953.** 2 figs. **MH-BH**—Aug. 21, 1952, 26°20′N, 55°40′W, sunset, a brilliant red flash appeared as edge of sun appeared below base of a large Cu cloud, followed by a brilliant bluish green flash as sun disappeared below horizon. *Subject Headings:* **1. Green flash 2. Red flash.**—*C.E.P.B.*

5.5–230 551.593.63:551.509.3

*CHernov, V. M., **Kratkie dannye o nabliudeniiakh nad galo v period 1920–1947 gg** [Brief report on halo observations during the period 1920–1947.] *Meteorologiia i Gidrologiia* No. 6:27–29, **1952.** table, 8 refs. **DLC**—Summary of halo observations carried out durin the last 30 years in different points of the U.S.S.R. The halos have a good pronounced annua range and the appearance of a halo predicts an increase of cloudiness for next day and change of temperature. The grade of halo intensity indicated the rate of future change o weather (by intensive halo the change is rapid). Numerous varieties of halos are observe in northern latitudes. *Subject Headings:* **1. Halo observations 2. Local forecasting.**—*N.T.Z.*

5.5–231 551.593.6

Hoinkes, H., **Beobachtung einer Untersonne.** [Observation of an inferior parhelion.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 6(1):108–110, **1953.** fig German, English and French summaries p. 108. **MH-BH**—A photograph is shown of a unusually luminous inferior parhelion seen Dec. 31, 1951, 14½ h., near St. Anton in Arlber It was due to falling snowflakes lying horizontally. *Subject Heading:* **1. Parhelia.**—*C.E.P.B.*

5.5–232 551.593.6

Jaggi, Martin, **Farbphotographien eines Sonnenhalos in Cuba.** [Color photographs o a solar halo in Cuba.] *Geofisica Pura e Applicata*, 23:124–129, **1952.** 8 figs., plate, 6 ref English summary, p. 124. **MH-BH**—Circular halo of 22°, circumscribed by a doubly tange oval. Elevation of sun 65°. Author explains origin of halo, distinguishing between fou cases dependent on the height of the sun and the position of the refracting ice prizma in cirrus cloud. *Subject Headings:* **1. Halo origin 2. Halo photographs 3. Cuba.**—*A.A.*

ELECTRICAL PHENOMENA

See also: **Lightning in art** (Rieth), 5.5–8.

5.5–233 551.594.1

†Israël, Hans, **Zur Methodik luftelektrischer Messungen. III, Aerologische Mes methoden.** [Methods of atmospheric electricity measurement. III, Aerological measureme methods.] *Germany. Deutscher Meteorologischer Dienst im Französischen Besatzungsgebi Wissenschaftliche Arbeiten*, 2:20–31, **1950.** 4 figs., 3 tables, 39 refs., 17 eqs. **DLC**—T tendency (formerly widely adopted) to select "undisturbed days" for the measurement atmospheric electricity has been eliminated from modern atmospheric electricity measureme methods. Modern methods are based on the investigation of atmospheric phenomena respect of their electrically constructive or destructive properties. Old surface and aerologi electricity measurement methods and modern aerological methods are reviewed and discusse The emphasis is on the description of the radioactive collector, on various possibilities captive balloon measurements and on measurements in airplane flight. *Subject Headi* **1. Atmospheric electricity measurement.**—*G.T.*

5.5–234 551.594.11

†Parkinson, W. D. (*Carnegie Inst. of Wash., Dept. of Terrestrial Magnetism*), **Review of t literature on the ion balance of the lower atmosphere since 1939.** *I.U.G.G. Associat of Terrestrial Magnetism and Electricity, IATME Bulletin*, No. 13:307–313, **1950.** tab 53 refs. **DWB**—A systematic review of over 50 papers on the subject of: the equation small ion balance; atmospheric pollution and potential gradient; the electric effect and sp charge; values of combination coefficients; nature of condensation nuclei; slow ion mobil spectrum; time and space distribution of condensation nuclei; and causes of ionization in t lower atmosphere. *Subject Headings:* **1. Atmospheric ions 2. Ion balance 3. Poten gradient 4. Atmospheric pollution 5. Review articles.**—*M.R.*

5.5–235 551.594.12:551.510.535:523.7

Kallmann, H. K. (*Calif. Univ., Los Angeles*), **The continuous layer formation in atmosphere under the influence of solar radiation.** *Physical Review*, 90(1):153–154, April

1953. 2 figs., 5 refs. **DWB**—The continuous increase or decrease of electron density with height under influence of a quiet and a disturbed sun was investigated. The results, presented in diagrams, correspond to the order of magnitude of frequencies as used by the radio technician for E-layer reflections. *Subject Headings:* **1. Electron density 2. Ionospheric reflection 3. Solar phenomena.**—*W.N.*

5.5–236 551.594.12:551.521.64

Neher, H. V. (*Calif. Inst. of Techn., Pasadena*) and Forbush, S. E. (*Carnegie Inst. of Wash., Wash., D. C.*), **Correlation of cosmic-ray ionization measurements at high altitudes, at sea level and neutron intensities at mountain tops.** *Physical Review*, 87(5):889–890, Sept. 1, 1952. 2 figs., 5 refs. **DLC**—Based on long series of balloon flights during the summer of 1951. Ionization measurements at high and at low altitudes are correlated and compared with contemporary measurements of neutron density by other workers. Fluctuations of cosmic rays as measured in: 1) the ionization at 70,000 ft over North Dakota, 2) the meson component at Cheltenham, Md., 3) the meson component at the geomagnetic equator, and 4) the neutron component at mountain tops in Colorado and New Mexico, show good correlation. *Subject Headings:* **1. Ionization density 2. Cosmic ray variations.**—*W.N.*

5.5–237 551.594.12

Ruttenberg, S.; Rickinson, R.; Schilling, G. F. and Holzer, R. E., **Some measurements of the variation of electrical space charge near the ground.** California. Univ. at L. A. Institute of Geophysics Contract AF19(122)-254, Scientific Report, No. 2, March 15, 1952. 8 p. 3 tables, 2 figs., 10 refs. **DWB**—Results of simultaneous measurements of potential gradient and air conductivity at ground level and at a height of 3 m are presented for 6 hrs of a fair weather winter day in California, as well as additional measurements of the variation of the potential gradient with height. *Subject Headings:* **1. Electrical charge near the ground. I. California. Univ. at L. A. Institute of Geophysics II. Contract AF19(122)-254.**—*A.A.*

5.5–238 551.595.13 551.508.94

Hess, Victor F. and Parkinson, W. D., **Small ion balance over the ocean.** Fordham Univ. Dept. of Physics, Contract AF19(122)-409, Dec. 1952. 42 p. 10 figs., tables, 6 refs. **DWB**—Positive conductivity and Aitken nuclei densities were measured on a double crossing of the North Atlantic. Most of the data conforms to the equation of ion balance. Radioactivity measured in fog, indicates probable RaC content. A self-recording conductivity meter with a vibrating reed electrometer, which is unaffected by the motion of the ship, is described in some detail. Results are discussed for thick and thin walled ionization chambers. *Subject Headings:* **1. Ion balance 2. Nuclei densities 3. Conductivity meters. I. Fordham University. Dept. of Physics II. Contract AF 19(122)-409.**—*A.A.*

5.5–239 551.594.223

Benedicks, Carl, **Theory of the lightning-balls and its application to the atmospheric phenomenon called "flying saucers."** *Arkiv för Geofysik*, Stockholm, 2(1), 1952. 11 p. plate, 2 figs. **DWB**—The author develops an interesting theory for the origin and behaviour of the controversial lightning balls and flying saucers which have been observed for some centuries. The fact that H_2O can dissociate into atomic hydrogen and oxygen at temperatures $>3500°C$ and that temperatures in a lightning stroke can easily be $>5000°C$, is used to explain the origin of the ball of hot, luminous gas. This gas behaves like a bubble of gas in water, since it is so much less dense than the surrounding medium. The intense heat is conserved, except along the boundary layer, by the high reflectivity produced by the discontinuity, and the shape remains spherical or elongated depending on whether the air is still or in motion. The explosion occurs when the temperature of the mass or of an appreciable portion thereof suddenly cools to $<3500°C$ so that recombination occurs suddenly rather than gradually. The normal water vapor barrier around the oxyhydrogen "bubble" prevents contact of the hot gas with objects which might otherwise be burned, but if any object or person happens to be within the ball when it explodes it or he would be disintegrated. Two possible instances of such are cited. The idea that "flying saucers" are similar but elongated bubbles rising rapidly in strong air currents at high levels is elaborated. (See item for reference to article

by HELGE PETERSEN showing a photograph of a lightning ball). "Bead lightning" is said to be the cylinder of dissociated gas produced by a stroke broken up into a series of balls in attempt to have minimum surface. *Subject Headings:* **1. Ball lightning 2. Flying saucers 3. Bead lightning.**—*M.R.*

ACOUSTICAL PHENOMENA

See also: **Influence of weak atmos. heterogeneities on dispersion of sound and light** (Oblukhov), 5.5–227.

5.5–240 551.596.1:621.396

Doak, P. E. (*Dept. of Math. Univ. Manchester*), **The reflection of a spherical acoustic pulse by an absorbent infinite plane and related problems.** *Royal Society of London, Proceedings,* 215(1121):233–254, Nov. 25, 1952. 2 figs., 6 refs., 8 eqs. **DLC**—Experimental results of the reflection of a short train of sine waves, duration of about 10 ms, by an infinite plane absorbent wall are analyzed and discussed theoretically in relation to blast waves and electromagnetic waves. Some possible direct applications are indicated as to reflection of blast waves and waves of transient radiation by an electric dipole. *Subject Headings:* **1. Acoustical propagation 2. Radio wave propagation 3. Reflection echoes.**—*W.N.*

PART II. ANNOTATED BIBLIOGRAPHY ON BALLOONS

By: *Geza T. Thuronyi*

INTRODUCTORY NOTE

The subject of this bibliography is balloons as meteorological instruments. As a rule, only works containing descriptions of meteorological balloons or discussion of their construction, material, operation, aerodynamic performance, i.e. their technical characteristics, were included. Papers dealing with ascentional rates, or with methods of determining same, were omitted and so was all the literature presenting aerological data obtained by means of balloons, unless they also include technically relevant information on balloons.

Although the first balloon flights for scientific purposes were undertaken as early as the beginning of the 19th century, and the question of unmanned meteorological balloons was raised in 1809, the end of the 19th century may be considered as the time from which literature on meteorological balloons in the proper sense can be clearly separated from the profuse aeronautical literature. Accordingly, the period covered by this bibliography is 1900–1953, with only a few references (mostly of historical interest) reaching back as far as 1862.

With the exception of a few instances in which the operation of balloons is largely dependent on geographic factors (like in the case of operations in the Arctic, 5E–13, –23, –66, –70 or in the tropics, 5E–16, –21, –24, –27, –103 and –104, or long horizontal trajectories, 5E–115, –126) the aspect of geographic location is irrelevant in the literature considered. No attempt has therefore been made to organize the material from a geographic point of view.

To facilitate the use of the Outline of Contents given hereunder may it be noted that it is arranged under the following general headings:

TYPE OF BALLOON
ENVELOPE MATERIALS
CONSTRUCTION AND DESIGN
ACCESSORIES
OPERATION AND MAINTENANCE
PERFORMANCE
EFFECTS OF METEOROLOGICAL FACTORS ON BALLOON FABRIC OR PERFORMANCE
AEROLOGICAL MEASUREMENT TECHNIQUES

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ANNOTATED BIBLIOGRAPHY ON BALLOONS

1862

5E–1 551.507.321:551.501.7

Glaisher, James, **On the meteorological observations made in eight balloon ascents.** *British Meteorological Society, Proceedings*, 1(5):234–260, Nov. **1862.** 9 plates, tables. **DLC**—Descriptive accounts with tabulated results and trajectory diagrams of the historical scientific balloon ascents made by the author. The flights described include the ascent to a height of 7-miles during which the author lost consciousness (Wolverhampton, Sept. 5, 1862). *Subject Headings:* **1. Free balloons 2. Stratosphere ascents 3. Upper air observations.**

1866

5E–2 551.507.321

Graham, Thomas, **On the absorption and dialytic separation of gases by colloid septa. Part I: Action of a septum of caoutchouc.** *London, Edinburgh and Dublin, Philosophical Magazine and Journal of Science*, 32:401–420, Dec. **1866.** fig., 3 tables, refs. **DLC**—A simple experimental apparatus (the diffusiometer) for measuring permeability of colloids to gases is described in detail and illustrated. Results obtained with the apparatus are reported. Findings regarding permeability of (1) india-rubber between double cotton cloth vulcanized, (2) vulcanized india-rubber tubing, (3) sheet rubber 1 mm thick, (4) thin balloons of india-rubber, (5) silk cloth varnished with rubber and (6) gutta percha and other septa are discussed. *Subject Heading:* **1. Balloon fabrics.**

1897

5E–3 551.506.7:551.507.321.2

Hergesell, Hugo, **Der Flug der Registrirballons.** [The flight of sounding balloons.] *Illustrierte Aëronautische Mittheilungen*, Berlin, 1:44–49, **1897.** table, eqs. **DLC**—Data on the flight performance of the first balloons used for unmanned ascents at Paris (1893–96), Strassburg (1896–7) and Berlin (1894) are tabulated (name of balloon, total weight, volume, maximum height reached, horizontal velocity, vertical velocity during ascent and descent, general direction of flight, date, and notes on weather situation). Various factors affecting the performance of balloons are discussed (quality of material, condensation of water vapor on the balloon, oscillatory movements, time of day, extent of inflation). *Subject Headings:* **1. Free balloons 2. Balloon performance.**

5E–4 551.507.321.4

Riedinger, August, **Der Drachenballon für meteorologische Zwecke.** [Kite balloons for meteorological purposes.] *Illustrierte Aëronautische Mittheilungen*, 1:42–44, **1897.** 2 figs. **DLC**—The author made experiments with a spherical captive balloon and found that the maneuvering of such a balloon presents insurmountable difficulties. Use of kite balloons for military purposes suggests their suitability as meteorological instrument-carriers. Planned experiments with 64 cu m meteorological kite balloons are announced and diagrams of the balloon presented. *Subject Headings:* **1. Captive balloons 2. Kite balloons.**

1899

5E–5 551.507.321

Gross, Hans, **Das Ballonmaterial.** [Balloons.] (In: Assmann, Richard and Berson, Arthur, **Wissenschaftliche Luftfahrten.** Braunschweig, **1899.**) v. 1. p. 139–163. **DWB**—Detailed discussion of construction and performance of balloons participating in the scientific research flights of the German Society for the Advancement of Ballooning. In addition to manned balloons made of cotton, silk or goldbeater's skin, the 130 cu m balloon "Meteor" (varnished silk) was used as a captive balloon and "Cirrus I" and "II" (250 and 400 cu m, varnished and rubber-coated silk, respectively) were used as unmanned sounding balloons. Many details concerning the effect of meteorological factors, such as atmospheric electricity, solar radiation, clouds, etc. on the behavior of balloons are considered. The behavior of a balloon at equilibrium level is described. *Subject Headings:* **1. Balloons 2. Balloon fabrics 3. Balloon performance.**

1900

5E–6 551.507.321.2

Hergesell, Hugo, **Ein neuer Abwurfhaken für Registrirballons.** [New release hook for sounding balloons.] *Illustrierte Aëronautische Mittheilungen*, 4:44, **1900.** diagr. **DLC**—A double hook which releases the ballast bag of sounding balloons, when the ballast has been reduced to a certain weight, is described and shown in a self-explanatory diagram. In addition to releasing the

ballast bag the mechanism can be made to trigger instruments at a given time. *Subject Headin* **1. Balloon accessories.**

5E–7 551.58

Rotch, Abbot Lawrence, **Sounding the ocean of air.** New York, **1900.** 184 p. 12 figs., 1 plates. **DWB**—A book on aerology. In Chap. 3 (p. 63–97) notable balloon ascents are discusse and free and captive balloons described and illustrated. In Chap. 4 (p. 98–116) the author dea with sounding balloons. This chapter contains an account of the performance of the Germa balloon "Cirrus," which was made of rubber fabric. Its capacity was 8,700 cu feet and its free lif when inflated with coal gas, was 290 lbs. In April 1895 a height of 72,000 feet was reached with th balloon. Balloons made of paper and of goldbeater's skin are also mentioned. *Subject Heading* **1. Upper air soundings 2. Balloons.**

1901

5E–8 551.501

Assmann, Richard, **Die modernen Methoden zur Erforschung der Atmosphäre mittels d Luftballons und Drachen.** [Modern techniques of investigating the atmosphere by means balloons and kites.] *Gesellschaft Urania, Berlin, Sammlung populärer Schriften,* No. 57, 190 8 figs., plate. **DWB**—History and international status of all types of aerological research metho known at the time are discussed in detail (manned balloons, pilot balloons, kites, sounding balloon kite balloons). *Subject Headings:* **1. Upper air soundings 2. Kites 3. Balloons 4. History meteorology.**

1903

5E–9 551.506.7:551.507.321

de Quervain, Alfred, **Étude de l'atmosphère libre par sondages. Rapport sur les lancers ballons-sondes faits en Russie.** [Sounding the free atmosphere. Report on the sounding ballo ascents made in Russia.] Reprinted from: *Observatoire de Météorologie Dynamique, Trapp Travaux Scientifiques,* v. 3, **1903.** 72 p. 8 figs., tables. **DWB**—Chap. 4 (p. 11–26) contains detailed description of installations, equipment and methods used in Moscow during the soundi balloon operations of a French expedition (1901). The soundings were carried out with spheric varnished paper balloons of 4.5, 5, and 5.5 m diameter, inflated with illuminating gas. *Subj Headings:* **1. Sounding balloons 2. Upper air soundings 3. Moscow, U.S.S.R.**

5E–10 551.507.312

Hergesell, Hugo, **Über das Aufsteigen von geschlossenen Gummiballons.** [The ascent closed rubber balloons.] *Illustrierte Aëronautische Mitteilungen,* 7(5):163–168, May **1903.** tab eqs. **DLC**—Various physical properties characterizing the ascent of closed extensible balloons theoretically formulated. The factors investigated are: free lift, inner pressure, diameter, rate ascent. *Subject Heading:* **1. Balloon research.**

1905

5E–11 551.507.321.2:551.50

Hergesell, Hugo, **Ballon-Aufstiege über dem freien Meere zur Erforschung der Temperat und Feuchtigkeitsverhältnisse sowie der Luftströmungen bis zu sehr grossen Höhen der Atmosphä** [Balloon ascents at sea for investigating temperature, humidity and circulation of the air up to ve high altitudes.] *Beiträge zur Physik der freien Atmosphäre,* 1(4):200–204, **1905. DLC**—T author explains his twin balloon technique with an electrically controlled hook which releases c of the balloons at a pre-determined level. The technique was used in ascents (from ships) sponso by the Prince of Monaco. Details of ascents made with this technique in 1905 are reported. *Subj Headings:* **1. Sounding balloons 2. Tandem balloons 3. Marine aerological observations.**

5E–12 551.507.321.2(

Rotch, A. Lawrence, **On the first observations with registration balloons in America.** *Ameri Academy of Arts and Sciences, Boston, Proceedings,* 41(14):347–350, Dec. **1905.** table, ref. A stracted from reprint. **DWB**—Account of 23 sounding balloon ascents organized by the author St. Louis in 1904 and 1905 (the first in the U.S.). The 6-foot diameter rubber balloons were suppl by the Continental Rubber Co., Hannover. A table showing minimum temperature record altitude reached (highest: 56,000 ft), distance travelled, duration of flight and average velocity presented. Twenty-two out of the 23 balloons launched were recovered. *Subject Headin* **1. Sounding balloons 2. History of meteorology.**

1907

5E–13 551.507.321.2:551.506.7(2

Hergesell, Hugo, **Die Erforschung der freien Atmosphäre über dem Polarmeer.** [Investigat of the free atmosphere over the Arctic Ocean.] *Beiträge zur Physik der freien Atmosphäre,* 2(3):

,98, 1906/7. **DLC**—In this account of soundings from ships in the Arctic conducted under sponsorship of the Prince of Monaco (1906) the author briefly refers to three techniques: 1) the tandem balloon technique (*see also item* 5E–11 above); 2) the captive balloon technique (reaching heights over 3,000 m) and 3) the pilot balloon technique. *Subject Headings:* **1. Tandem balloons 2. Captive balloons 3. Marine aerological observations 4. Arctic Ocean.**

1908

5E–14 551.507.321.2

Palazzo, L., **Beschreibung zweier Vorrichtungen zum Abwerfen oder Entleeren eines Ballons bei den Ballonaufstiegen über dem Meere.** [Two devices for releasing or deflating balloons during ascents over the sea.] *Beiträge zur Physik der freien Atmosphäre*, 2(5):208–211, **1908.** 3 figs., 3 refs. **DLC**—HERGESELL developed a device for releasing one of the balloons in tandem balloon soundings over sea, thus permitting the other to descend. The device is electrically controlled. The author points out various disadvantages of HERGESELL's release hook and describes and illustrates a mechanism developed by himself. This mechanism is controlled by atmospheric pressure; it either releases or deflates one of the twin balloons at a predetermined pressure level. *Subject Headings:* **1. Sounding balloons 2. Tandem balloons.**

1909

5E–15 551.501.7:551.501.1(26)

Teisserenc de Bort, L. and Rotch, Abbot L., **Exposé technique de l'étude de l'atmosphère marine par sondages aériens. Memorandum on the technique of the exploration of the atmosphere by sounding-balloons at sea.** Paris, [1909?]. 23 p. In French and English. 11 figs., ref. French text reprinted from: *Trappes. Observatoire, Travaux Scientifiques*, Vol. 4:39–51, **1909. DWB**—Account of experience gained in aerological observation over the Atlantic in middle latitudes and intertropical regions. Details of operation of kites, captive balloons (25 cu m, goldbeater's skin), sounding balloons (Hergesell's tandem method) and pilot balloons (paper) are discussed. *Subject Headings:* **1. Marine aerological observations 2. Balloons 3. Kites.**

1910

5E–16 551.506.7(6)

*Berson, Arthur, **Bericht über die aerologische Expedition des Königlichen Aeronautischen Observatoriums nach Ostafrika im Jahre 1908.** [Report on the aerological expedition of the Royal Aeronautical Observatory (Lindenberg) to East Africa in 1908.] *Lindenberg. (K.) Preussisches Aeronautisches Observatorium, Ergebnisse der Arbeiten*, Braunschweig [separate, unnumbered volume], publ. **1910.** 119+p. figs., tables, plates. **DWB**—Owing to many mistakes in manufacturing and handling, the usually excellent products of Continental Rubber Co., Hannover, gave very unsatisfactory performance during the expedition. The efforts made during inflation and launching to overcome some of the deficiencies are described in detail in the introductory part to this report (p. I–XXXIII). The balloons were made of rubber at a diameter of 800–1000 mm. *Subject Headings:* **1. Upper air data 2. Sounding balloons 3. East Africa.**

5E–17 551.507.321:629.13

Emden, Robert, **Grundlagen der Ballonführung.** [Rudiments of ballooning.] Berlin, **1910.** 140 p. 2 figs., tables, eqs. **DWB**—Theoretical and practical knowledge required for the mastery of the art of maneuvering balloons is contained in this manual. Technical details like the expansibility of rubber fabrics, the properties of illuminating gas and hydrogen, etc. are touched upon. Effect of gas and air temperature on free lift are dealt with in particular. Both constant gas volume and constant gas weight balloons are considered. *Subject Headings:* **1. Balloons 2. Balloon manuals.**

1912

5E–18 551.507.321.2

*Blair, William R., **Free balloon ascensions at Omaha and Indianapolis, September 25 to October 12, 1909.** *Mount Weather Observatory, Bulletin*, 3(3):127–150, Oct. 31, **1910.** 8 figs., tables.—Also: **Free air data. Sounding balloon ascensions at Indianapolis, Omaha and Huron.** *Ibid.*, 4(4):183–304, April 5, **1912.** 33 figs., 10 tables. **DLC**—The introductory parts to these two reports contain specifications of the sounding balloons used and performances achieved. Rubber balloons were used as single units or in pairs. Highest altitude reached was close to 30,500 m. Table II on p. 184 of Vol. 4 Pt. 4 gives date, hour, number, cubic content and ascentional force of balloons, starting point, landing point, horizontal distance travelled, direction, highest altitude reached and lowest temperature recorded for the 80 ascents made in 4 series. *Subject Headings:* **1. Sounding balloons**

2. Balloon performance 3. Tandem balloons 4. Balloon height maxima 5. Upper air data 6. Mount Weather Observatory, Virginia.

5E–19 551.507.321:551.524

Wegener, Kurt, [**Über**] **die Temperatur des Gases im Freiballon.** [Gas temperature in free balloons.] *Beiträge zur Physik der freien Atmosphäre*, 3(1):39–56, 1909; 5(1):63–68, **1912.** 2 figs. **DLC**—Results of comparative air and gas temperature measurements are reported. The measurements were made during 10 ascents in and outside balloons filled with illuminating gas. Average difference between air and gas temperature was 36°C at 3,400 m, 43.5° at 3,700 m and 51.2° at 4,100 m. The author gives a detailed discussion of the behavior of balloons under the influence of varying radiation balance. As a basic principle of a balloon's radiation balance the author offers the statement that gas temperature is determined by the temperature of the envelope, which depends on radiation, conduction and ventilation. *Subject Headings:* **1. Free balloons 2. Balloon temperature.**

1913

5E–20 551.507.321.2

Gamba, Pericle, **Sulla più grande altezza raggiunta da un pallone sonda e la distribuzione verticale della temperatura nell'atmosfera terrestre.** [The highest altitude reached by a sounding balloon and vertical atmospheric temperature distribution.] (*R.*) *Istituto Lombardo di Scienze Lettere, Milano, Rendiconti*, Ser. 2, 46(11):505–521, **1913.** fig., table, 15 refs. **DLC**—First-hand report on the controversial ascent of Pavia on Dec. 7, 1911, in which a rubber balloon (Continental Rubber Co., Hannover) is reported to have reached a record altitude of 35 km. Data recorded during the ascent are tabulated and discussed. (For comments *see item* 5E–37 below.) *Subject Headings:* **1. Balloon performance 2. Sounding balloons 3. Balloon height maxima.**

5E–21 551.587:551.507.32

van Bemmelen, Willem, **Die Erforschung des tropischen Luftozeans in Niederländisch-Ost-Indien.** [Investigation of the tropical atmosphere over Netherlands East Indies.] *Luftfahrt und Wissenschaft*, Berlin, No. 5, **1913.** 50 p., 13 figs., tables, refs. **DWB**—Description of aerological techniques used at Batavia Observatory since 1909 (p. 1–22) includes day- and night-time pilot balloons, sounding balloons, captive balloons and the free balloon "Batavia." *Subject Headings:* **1. Upper air data 2. Balloons 3. Indonesia.**

1914

5E–22 551.507.32

Frenzel, Walther, **Die Gasdurchlässigkeit gummierter Ballonstoffe.** [Permeability to gas of balloon fabrics coated with rubber.] *Zeitschrift für Flugtechnik und Motorluftschiffahrt*, Munich, Berlin, 5(18/19, 20/21):264–266; 271–274, Oct. 17; Nov. 14, **1914.** ref. **DLC**—Use of the interferometer for permeability tests of fabrics is described. Experiments conducted with the purpose of determining gas permeability of various balloon fabrics as a function of pressure and temperature are reported and their results discussed. *Subject Heading:* **1. Balloon fabric permeability**

5E–23 551.507.321.2:551.506.7(26

*Hergesell, Hugo, **Aerologische Studien im arktischen Sommer.** [Aerological investigations during the Arctic summer.] *Beiträge zur Physik der freien Atmosphäre*, 6(4):224–261, March 20, **1914.** tables. **DLC**—In this report which mainly contains results of aerological measurements made from ships in the Arctic (1906, 1907 and 1910) the author also briefly refers to various details connected with the three techniques used (tandem sounding balloon, captive balloon and pilot balloon technique). *Subject Headings:* **1. Upper air data 2. Balloons 3. Marine aerological observations 4. Arctic Ocean.**

5E–24 551.524.7:551.507.321

van Bemmelen, W., **Remarkable upper-air records at Batavia.** *Nature*, London, 113:5–6, March 5, **1914.** table. Comments by C. Braak: **The vertical temperature distribution in the atmosphere.** *Ibid.*, p. 6–7. **DLC**—On Dec. 4, 1913 −90.9°C was registered by a sounding balloon at tropopause at 17 km, increasing to −57.1°C at 26.04 km. On Nov. 5, 1913, −91.9°C was registered. Accuracy is confirmed by agreement of traces during ascent and descent. *Subject Headings:* **1. Sounding balloons 2. Upper air temperature extremes 3. Tropopause temperature extremes 4. Batavia, Java. I. Braak, C.**—*C.E.P.B.*

1915

5E–25 551.507.321

Schütze, Alfred, **Eine neue Fülltülle für Pilotballons.** [New filling nozzle for pilot balloons] *Meteorologische Zeitschrift*, 32(9):416–417, Sept. **1915.** 2 figs. **DWB**—Faults of previous methods

lf filling are briefly discussed. The author then describes his new device which obviated the lengthy rocesses of the older method. It consists essentially of a filler of known weight, a set of attachable eights and a special valve. The two diagrams showing the device are self-explanatory. *Subject Headings:* **1. Pilot balloons 2. Balloon accessories.**—*G.J.E.*

1916

5E–26 551.507.321.4

Tenani, Mario, **Nuovo metodo di misura dei moti orizzontali e verticali dell'atmosfera per mezzo i un pallone pilota frenato.** [New technique for measuring atmospheric horizontal and vertical notion by means of a captive pilot balloon.] *Nuovo Cimento*, Bologna, 6th Ser., 11(1/2):87–94, an./Feb. **1916.** 4 figs., refs., eqs. **DLC**—A method of calculation is developed whereby wind peed and direction can be determined with a captive pilot balloon, when the balloon is not visible. he elements of the calculation are free lift of the balloon, length of rope, angle of rope and traction. graphical method is also suggested as a shortcut to calculations. *Subject Headings:* **1. Pilot alloons 2. Captive balloons.**

5E–27 551.506.7

*van Bemmelen, W., **Results of registering-balloon ascents at Batavia.** *Indonesia.* (*K.*) *Magnetisch en Meteorologisch Observatorium te Batavia, Verhandelingen*, No. 4, **1916.** 57+109 p. 8 tables (1 fold.) in text, plus 109 p. of tables. **DWB**—Hundred and three ascents made at Batavia 1910–1915 with rubber balloons of the Hannover Continental Company (wall thickness 0.2 mm; eight 1.5–3 kg) are described and results reported. Performance of balloons is discussed. While he tabulated data are mainly on results of the measurements; rates of ascent, bursting heights, and ther operational details are also included. (*Same item as* 5D–40, April 1954, *MAB.*) *Subject leadings:* **1. Upper air data 2. Sounding balloons 3. Batavia, Java.**

1918

5E–28 551.507.321.2

Crestani, Giuseppe, **Considerazioni sulla tecnica dell'esplorazione atmosferica eseguita col alloncino pilota, sull'esame e sulla discussione dei resultati ottenuti con tal metodo.** [Investigation f the atmosphere by means of the pilot balloon technique, evaluation of data obtained by that nethod and conclusions drawn therefrom.] *Rivista Italiana di Aeronautica*, Rome, 12(10/12):205–07, Oct./Dec. **1917;** 13(1/2):1–4, Jan./Feb. **1918.** 3 figs., 2 tables, refs. **DLC**—Benefitting from xperience gained in the daily aerological observation carried on at the aerological station Vigna di alle the author discusses the height limit of pilot balloons under various circumstances, the accuracy f pilot balloon measurement (considering several sources of error), evaluation of data, and results btained by means of pilot balloons in respect of the structure of surface and upper air winds. *Sub- ect Headings:* **1. Pilot balloons 2. Balloon performance 3. Upper air wind measurement.**

5E–29 551.507.321

Edwards, Junius David, **Determination of permeability of balloon fabrics.** *U. S.* [*National*] *Bureau of Standards, Technological Papers*, No. 113, July 2, **1918.** 31 p. 7 figs., 4 tables, refs. **DWB**—Discussion of methods for determining permeability to hydrogen of balloon fabrics, including escription of the test adopted by the National Bureau of Standards. Effect of experimental condi- ions characterized by various factors such as temperature, pressure, humidity of hydrogen and air, olatile substances in fabric, duration of test, rate of air flow, size and shape of cell, concentration of ydrogen, are considered. Permeability values obtained by various methods are tabulated for everal fabrics. *Subject Heading:* **1. Balloon fabric permeability.**

1919

5E–30 551.521.1:551.507.321

Edwards, Junius David and Long, Maurice Blaine, **Effect of solar radiation upon balloons.** *U. S.* [*National*] *Bureau of Standards, Technological Papers*, No. 128, June 13, **1919.** 29 p. 6 figs., 2 tables, refs., 15 eqs. **DWB**—Extensive study of the effect of solar radiation upon balloons, com- prising details on radiation characteristics of fabrics, temperature balance of balloons as shown by calculations and experimental measurements, deterioration of fabrics, etc. Radiation character- istics of 24 different fabrics are tabulated (reflection, transmission, absorption). Effect of color is considered. *Subject Headings:* **1. Balloon fabrics 2. Balloon temperature 3. Balloon color 4. Solar radiation effects on balloons.**

5E–31 551.507.321.2

Jentzsch-Graefe, Felix, **Über Kollodiumpiloten.** [Pilot balloons made of collodion.] *Me- teorologische Zeitschrift*, 36(9/10):272–275, Sept./Oct. **1919.** 2 tables. **DLC**—A simple manu-

facturing process for producing pilot balloons from non-expansible collodion film is described. Th author produces evidence to the effect that collodion pilot balloons (unlike paper balloons) ascen at a practically constant rate and therefore can be evaluated like rubber balloons, without specia ascension tables. The constant rate of ascent is a result of light weight and consequently conside able free lift. *Subject Headings:* **1. Pilot balloons 2. Balloon fabrics.**

5E–32 551.501.7:551.507.321.

Pick, W. H., **An exceptional pilot balloon ascent.** *Great Britain. Meteorological Office, Ci cular* No. 35:3, May 1919. **GB-MO**—At Murmansk, March 29, 1919, a 37 gm white balloo was followed for 4 h 18 min. At a theoretical lift of 500 ft/min this would make height 129,000 f which PICK does not believe. There is no reason to suppose balloon was leaking but it may hav been floating in a layer of density equal to itself. *Subject Headings:* **1. Pilot balloons 2. Balloo performance.**—*C.E.P.B.*

1920

5E–33 551.507.321.

Crestani, Giuseppe, **Sui limiti dell'altezza dell'esplorazione dell'atmosfera col palloncino pilot** [Height limits of aerological exploration by means of pilot balloons.] *Meteorologia Pratica*, Monte cassino, 1(1):22–25, Jan./Feb. **1920.** 2 tables, ref., 4 eqs. **DWB**—On the assumption that 0.0 mm is the minimum thickness to which rubber can be extended, maximum heights are tabulated fo balloons of 30, 40 and 50 g, inflated to varying ascension rate and free lift. A 50 g balloon, fo example, with a rate of ascent of 150 m/min should reach its maximum height of 8,000 m in 51 mi (For comments *see item* 5E–54 below.) *Subject Headings:* **1. Pilot balloons 2. Balloon performanc**

5E–34 551.507.321.

Richardson, Lewis F., **Sun-flash balloons for continuous signalling.** *Royal Meteorologic Society, Quarterly Journal*, 46:293–294, **1920. DWB**—The suggestion is made that 2 cylindric surfaces (axes horizontal) should be attached to a pilot balloon, the angle between them determine by temperature or humidity and measured by the interval between sun flashes as the balloon rotate *Subject Headings:* **1. Pilot balloons 2. Balloon accessories.**—*C.E.P.B.*

5E–35 551.507.321.

Sumner, Percy J. H., **The design and stability of streamline kite balloons.** London, 192 146 p. figs., tables, eqs. **DWB**—This book on design and construction details of kite balloo contains a chapter on "Meteorological Balloons" (p. 85–91) which deals with the kite balloon as a instrument carrier. A balloon of 40,000 cu feet capacity, it is stated, can reach an altitude of 12,00 ft on a light cable, where readings could be "registered over any length of time." Performan characteristics of meteorological balloons of different capacity are tabulated and discussed. Th appendix (p. 93–129) contains formulas and computation tables for calculation of various stresse loads, resistances, etc., connected with captive balloons. A glossary of technological terms associat with kite balloons is featured on p. 130–134. *Subject Heading:* **1. Captive balloons.**

5E–36 551.507.321.

Watson-Watt, R. A., **Exceptional balloon ascents.** *Meteorological Magazine*, London, 55(652 73, May **1920. DLC**—In the single-theodolite pilot-balloon flight reported in this note a nomin height of 25 km was reached. The author describes experiments supporting the probability of suc performance. *Subject Headings:* **1. Pilot balloons 2. Balloon performance.**

5E–37 551.507.321.

Whipple, F. J. W., **The highest aerial sounding.** *Meteorological Magazine*, London, 55(658 226–227, Nov. **1920.** Comments by W. R. Gregg, *Monthly Weather Review*, 48(11):633, Nov. 192 **DLC**—Referring to the record ascent claimed to have been made at Pavia on Dec. 17, 1911, WHIPPL quotes various data from the original report on the flight (*see item* 5E–20 above) from which it wou appear that the altitude reached is more likely to have been 19 km than the reported 35 km. GREG agrees that the balloon in question probably reached considerably less than 35 km, even if WHIPPLE suggestion of 19 km (based on the assumption of constant rate of ascent) appears to be unjustifie Several other high soundings (above 30 km) are mentioned. *Subject Headings:* **1. Balloon pe formance 2. Sounding balloons 3. Balloon height maxima. I. Gregg, W. R.**

1921

5E–38 551.524.3:551.543:551.507.3

Richardson, Lewis F., **Lizard balloons for signalling the ratio of pressure to temperatur** *Great Britain. Meteorological Office, Professional Notes*, 2(18):73–93, **1921.** 5 figs., tables, ref

eqs. **DWB**—The indiarubber balloons described in this paper are inflated with hydrogen within an inextensible case of chiffon fabric. Horizontal expansion thus being precluded, the balloon expands vertically and at a given point triggers a mechanism which causes a tail to drop off and indicate a given ratio pressure/temperature. Manufacturing details, properties of fabrics, accuracy and results of ground and flight tests are discussed. *Subject Headings:* **1. Pressure-temperature correlations 2. Balloon equipment.**

1922

5E–39 551.507.321

Meisinger, C. LeRoy, **The free-balloon in meteorology.** *American Meteorological Society, Bulletin*, 3(2):27–28, Feb. **1922.** **DLC**—Brief note pointing out the advantages of manned balloons, such as easy control, within close limits, of location and altitude. The author deplores the fact that meteorologists have come to neglect free balloons in favor of kites and sounding balloons. *Subject Headings:* **1. Balloon comparisons 2. Free balloons.**

5E–40 551.507.321.2

Johnson, N. K., **The behaviour of pilot-balloons at great heights.** *Royal Meteorological Society, Quarterly Journal*, 48:49–59, **1922.** fig., 6 tables, 4 refs., 3 eqs. Discussion p. 57–59. **DWB**—Double theodolite ascents at Shoeburyness in autumn and winter with rate of ascent by DINES' formula 500 ft/min gave values of 504(0–5000 ft)–516(15–20,000 ft). The theoretical rate at 17,500 ft with no leakage is 549 ft/min. In some long ascents balloons began to descend after reaching 30–40,000 ft, probably through developing pinholes. Computed from one theodolite, on the assumption that the balloon was still rising, these would have given very erroneous heights and velocities. Experiments on balloons are described, showing that they can develop pinholes without bursting, and they will rarely rise above 40,000 ft. In the discussion R. CORLESS states that double theodolite ascents are not free from error. *Subject Headings:* **1. Pilot balloons 2. Balloon performance 3. Double theodolite soundings. I. Corless, R.**—*C.E.P.B.*

5E–41 551.587:551.507.321:551.507.351

Perlewitz, Paul, **Flugkörper und Drachenwarten.** [Aerial vehicles and kite stations.] *HANSA*, Hamburg, 59(43):1246–1250, Oct. 21, **1922.** table. **DLC**—A comparative table is presented, giving technical details and performance characteristics of 9 means of aerological research, e.g. big free and captive balloons, kites, small captive balloons, sounding balloons, pilot balloons, airplanes, air ships and sailplanes. Advantages and shortcomings of each technique are discussed. *Subject Headings:* **1. Upper air soundings 2. Balloon comparisons.**

5E–42 551.506.7:551.507.321.2

Wegener, Alfred and Kuhlbrodt, Erich, **Pilotballonaufstiege auf einer Fahrt nach Mexiko, März bis Juni 1922.** [Pilot balloon ascents during a trip to Mexico from March to June 1922.] *Aus dem Archiv der Deutschen Seewarte*, Hamburg, 40(4), **1922.** 46+p. 15 figs., tables, 5 diagrs. (fold.), refs. **DLC**—This paper contains a report on the first practical testing of the "mirror theodolite" technique for pilot balloon observation at sea (p. 9–13). Detailed instructions for pilot balloon measurement at sea are included (p. 13–14). Paper and rubber pilot balloons were used; their performance is discussed on p. 14–15. *Subject Headings:* **1. Marine aerological observations 2. Pilot balloons 3. Mirror theodolite technique.**

1923

5E–43 551.507.321.2

Wadsworth, John, **The relation between the height reached by a pilot balloon and its ascending velocity.** *Great Britain. Meteorological Office, Professional Notes*, 3(31):93–97, **1923.** 2 figs., table, eq. **DWB**—Calculations contained in this paper indicate that expansible balloons inflated to smaller ascensional velocity should reach higher altitudes than fast-ascending balloons. *Subject Headings:* **1. Balloon performance 2. Pilot balloons.**

1924

5E–44 551.507.321.2

Brunt, D., **High pilot balloon ascent at Shoeburyness, May 28, 1924.** *Meteorological Magazine*, London, 59(706):238–239, Nov. **1924.** **DLC**—The author reports a pilot balloon flight in which a 150-inch balloon was followed up to 50,000 ft with a double theodolite and for another 14 minutes with one theodolite. *Subject Headings:* **1. Pilot balloons 2. Balloon performance.**

5E–45 551.506.7(54):551.507.321.2

Field, J. H., **The free atmosphere in India. Introduction.** *India. Meteorological Department, Memoirs*, 24(5):133–166, **1924.** 43 figs., 8 tables, refs. **DWB**—Under the heading "Balloons"

(p. 134–137) the author gives a detailed description of the pilot and sounding balloons used in Simla India. Made of Indian gutta-percha tissue of 0.025 mm thickness weighing 24 g/sq m, these balloon have the advantage of low cost and good storage properties. They are manufactured at the aero logical station itself in a simple process described in this article. The sizes used are 0.6 and 0.9 m diameter for pilots and 1.5 or 1.8 m for instrument carriers. They are non-expanding, with leak from the seams and pinholes preventing excess inside pressure. Theoretical maximum height 23.8 km for a 3-m diameter balloon. Highest actual ascent observed was 16.5 km with a 0.9 m balloon weighing 60 g. Balloons, storage method and manufacturing process are illustrated. *Subject Headings:* **1. Sounding balloons 2. Upper atmosphere research 3. Balloon manufacture 4. India**

1925

5E–46 551.507.321

Sen, S. N., **Tetrahedral pilot balloon for high ascents.** *Meteorological Magazine*, London 60(715):172–174, Aug. **1925. DLC**—Leakage of hydrogen through balloon fabric is "one of the mo potent factors which determine the volume of the balloon at any stage of flight." Once the balloo has survived an initial distension and reached a considerable height, "the net effect of all causes probably a contraction instead of a distension." The excess surface appearing as a result of th shrinkage sometimes assumes an unstable tetrahedral shape leading to bursting. It is believed th balloons made in tetrahedral form and inflated to spherical shape which would be brought back their original (stable) form under strong tangential stress, would not be liable to burst. Reinforc ment by rubber strips in tetrahedral form is suggested as experimental technique. *Subject Heading* **1. Pilot balloons 2. Balloon performance 3. Balloon shapes.**

1926

5E–47 551.507.321.4 551.507.3

Grund, Rudolf, **Eine neue Vorrichtung zur Sicherung der Fesselaufstiege gegen Abreisse** [New device for protecting captive ascents against tearing off.] *Lindenberg. (K.) Preussisch Aeronautisches Observatorium, Arbeiten*, 15:306–307, **1926.** 2 figs. **DWB**—The author develope a device whereby auxiliary kites or balloons used with high-flying kites and captive balloons a automatically released when tension in the captive cable reaches a given critical value. Releas of the auxiliary kites or balloons restores normal pull stress. *Subject Headings:* **1. Captive balloo 2. Kites.**

5E–48 551.507.321.4 551.507.3

John, Hermann, **Zur Technik der Drachen und Fessel-Ballone.** [Kite and captive ballo technique.] *Das Wetter*, 43(12):281–288, Dec. **1926.** refs. **DWB**—An electric circuit is describe which is introduced into the cables holding kites or captive balloons. Various useful operatio connected with maneuvering, signalling or measurement can be performed by means of the remo control over captive balloons provided by this electric circuit. *Subject Headings:* **1. Captive balloo 2. Kite balloons 3. Balloon accessories.**

5E–49 551.507.3

Upson, Ralph Hazlett and Chandler, Charles de Forest, **Free and captive balloons.** New Yo The Ronald Press Co., **1926.** 331 p. 11 plates, 72 figs., tables, refs. **DWB**—A handbook military free and captive balloons, including instructions for operation and maintenance, descripti of specific American and foreign make balloons and accessories, detailed discussion of envelo fabrics, advice concerning balloon races, etc. Included are tables giving characteristics of a numb of rubberized fabrics. *Subject Headings:* **1. Free balloons 2. Captive balloons 3. Handbooks.**

1927

5E–50 551.507.32

Eredia, F., **Sui dispositivi e sui sistemi adottati nei lanci di palloni sonda.** [Equipment a techniques for launching sounding balloons.] *L'Aerotecnica*, Pisa, 7(9):549–554, Sept. **192** 4 figs. **DLC**—Aerological soundings at Vigna di Valle were conducted with interruptions sin 1912. After mentioning several types of sounding balloons used successively the author descrit the latest model, a 100 cu m balloon with automatic outlet valve. The advantage of this ballo is its fast ascending velocity which does not affect the bursting height. *Subject Headings:* **1. Soundi balloons 2. Balloon launching.**

5E–51 551.507.3

Hugo, Gustav, **Verhinderung des Gasdurchtritts bei älteren Ballonen.** [How to prevent g leakage from old balloons.] *Beiträge zur Physik der freien Atmosphäre*, 13(4):278–279, Dec. **19**

DLC—After 3 months' operation cotton fabric balloons with rubber coating have too much leakage for economical use. If such balloons are repeatedly treated with diluted glue they can remain in use 4–5 years. The treatment is described in detail. *Subject Heading:* **1. Balloon maintenance.**

5E–52 551.507.321.2

Kuhlbrodt, E., **Die Deutsche Atlantische Expedition auf dem Vermessungs- und Forschungsschiff "Meteor." III. Technik und bisheriger Umfang der Pilotballonaufstiege.** [German Atlantic Expedition on the research and surveying vessel "Meteor." Part 3. Methods of pilot balloon observation and extent of ascents to date.] *Annalen der Hydrographie und Maritimen Meteorologie*, 54:57–64, Sept. **1926.** 2 diagrs. (1 fold), tables, refs. Also: **V. Zweiter Bericht über den Umfang der Pilotballonaufstiege.** [Second report on the extent of pilot balloon ascents.] *Ibid.*, 55(8): 245–248, Aug. **1927.** 2 diagrs. (1 fold.), tables. Abstracted from reprint. **DWB**—Miscellaneous details of pilot balloon operations at sea are discussed. Particular attention is paid to the mirror theodolite technique, the handling and behavior of balloons (Continental Co., Hannover, 600 gram diameter, double-sheet, total thickness 0.4 mm), and rates of ascent. Tabulated flight summaries and diagrams giving comparative values of various theoretical and measured rates of ascent are presented. *Subject Headings:* **1. Pilot balloon ascents 2. Marine aerological observations 3. Mirror theodolite technique.**

1928

5E–53 551.507.321.2

Malsch, W., **Nachtbeleuchtung an Pilotballonen.** [Illumination of night pilots.] *Zeitschrift für angewandte Meteorologie*, 45(3):90–92, March **1928. DWB**—Development and experimental testing of firecracker-type illuminating device for night pilots is described. Fire hazard in case of premature bursting and loss of weight by combustion of the illuminating material are considered. *Subject Headings:* **1. Pilot balloons 2. Balloon accessories 3. Balloon illumination.**

5E–54 551.507.321.2

Martinozzi, Leonardo, **Sull'altezza raggiunta dai palloni piloti.** [On the height reached by pilot balloons.] *Meteorologia Pratica*, Montecassino, 9(5/6):196–199, Sept./Dec. **1928.** table, 4 eqs. **DWB**—When G. CRESTANI calculated maximum possible heights for various types of pilot balloons (*see item* 5E–33 above) he obtained values much too low as a result of neglecting the pressure exerted on the filling gas by the elastic force of the envelope. Calculations based on experimental results reported by WITKIEWICZ (*see item* 5E–58 below) would, for example, give 10,000 m as maximum height attainable with a 15 cm balloon if the ascension rate is 116 m/min, as opposed to 7,200 obtained by CRESTANI for an ascension rate of 120 m/min. *Subject Headings:* **1. Pilot balloons 2. Balloon performance.**

1929

5E–55 551.507.321.2

Chatterjee, G., **Balloons for upper air work.** *Nature*, London, 124(3134):793–794, Nov. 23, **1929. DLC**—Balloons made at the Upper Air Observatory of Agra, India, are described in a brief note. *Vulpro* rubber tissue (manufactured by Vultex Products Ltd., London) is joined together by Dunlop rubber solution diluted with carbon tetrachloride. During the three years of operation the balloons showed excellent storage and performance properties. Balloons 2½ ft in diameter, 0.004 in. thick, weighing about 150 g are reported to have carried useful weights of 110 g up to a height of 20 km. *Subject Headings:* **1. Sounding balloons 2. Balloon performance.**

5E–56 551.507.321.2

Di Maio, Raffaele, **Valvola per palloni frenati e liberi.** [Valve for free and captive balloons.] *L'Aerotecnica*, Rome, Pisa, 9(3):121–124, **1929.** 4 figs. **DLC**—A valve consisting basically of two interlocking cylinders is described and illustrated. The valve is mounted on the upper point of the balloon; it is controlled by a string whose other end is attached to the inner surface of the balloon's opposite point. Thus, whenever the balloon expands to excessive volume the necessary amount of gas is released. In addition to saving material this technique is claimed to have led to a gain of 3,000 m in altitude, compared to the method previously in use. *Subject Headings:* **1. Balloon accessories 2. Balloon performance.**

5E–57 551.507.3212.

Dines, L. H. G., **The maximum heights which it is possible to reach by sounding or pilot balloons.** *Meteorological Magazine*, London, 64(759):57–60, April **1929.** table, 3 eqs. **DLC**—After discussing several factors limiting the performance of balloons the author concludes that in the case of balloons made of inextensible envelope fabric "only by employing very large balloons made of very light material can heights appreciably greater than 20 km be reached"; in the case of rubber balloons 30 km is believed to be an approximate limit. *Subject Heading:* **1. Balloon performance.**

5E–58 551.507.321.

Witkewitsch, W., **Über die Maximalhöhe von Pilotballonen.** [Maximum height of pilo balloons.] *Beiträge zur Physik der freien Atmosphäre*, 26(1):17–25, **1929.** fig., tables, 3 refs 6 eqs. **DLC**—Experiments proved that pilot balloons made of rubber burst when they reach thickness of 0.016 mm, no matter what their initial thickness or diameter. Without aiming at a exact conclusion the author presents a theoretical formulation of the problem of maximum heigh for pilot balloons, and data obtained in Russian experiments and ascents. *Subject Headings:* **1. Bal loon performance 2. Pilot balloons.**

1930

5E–59 551.524.7:551.507.321.

Chatterjee, G. and Sur, N. K., **The thermal structure of the free atmosphere over Agra** *Beiträge zur Geophysik*, 25(3/4):266–278, **1930.** 8 figs., 2 tables. **DLC**—In a paragraph on p. 26 balloons made of *Vulpro* rubber tissue are referred to. While ordinary rubber balloons deteriorat too quickly for economical use in India, and attempts to reach the stratosphere with guttapercha balloons have failed, vulpro balloons were found capable of carrying a useful load of 110 g up to height of 20 km. These balloons were made of a tissue 0.004 in. thick, weighing 150 g at a diameter of $2\frac{1}{2}$ ft. *Subject Headings:* **1. Sounding balloons 2. Upper atmosphere research 3. India.**

5E–60 551.558:551.507.321.

Höhndorf, F., **Ergebnisse von Vermessungen statisch ausgewogener Pilotballone auf de Luvseiten der Rositтener Haffdüne und einiger Berghänge der Rhön.** [Results of measurement with statically balanced pilot balloons on the windward side of the Rositten Haff dune and a fe mountain slopes of the Rhön.] *Beiträge zur Physik der freien Atmosphäre*, 16(2):138–151, 193 9 figs., table. **DLC**—Results of measurements of orographic winds made with no-lift balloons a presented in tables and horizontal and vertical sections. Practical details of handling the balloon are discussed. *Subject Headings:* **1. Vertical currents 2. No-lift balloons.**

1931

5E–61 551.507.321

Frankenberger, E., **Hochfahrten von Registrierballonen.** [High flights of sounding balloons *Annalen der Hydrographie und Maritimen Meteorologie*, 59(1):20–22, Jan. **1931.** Shortened transl tion into English by J. C. Ballard, *Monthly Weather Review*, 59(6):237–238, June **1931. DLC**— Continental Rubber balloons of 0.017 cm thickness launched at Hamburg reached altitudes up to km. Average maximum height of 9 flights in Sept. 1930 was 23 km. It is asserted that heigh above 30 km can be reached without particular effort or expense. (In the translation note t erroneous rendition: "It is possible to reach altitudes of over 30 km only with great care and co siderable expense.") *Subject Headings:* **1. Balloon performance 2. Sounding balloons. I. Ballar J. C.** (*trans.*).

5E–62 551.507.321

Frankenberger, E., **Zur Steigerung der Höhenleistung von Registrierballonen.** [Improvi the height performance of sounding balloons.] *Beiträge zur Geophysik*, 33:112–117, **1931.** fi 2 refs. **DLC**—A simple method is suggested for testing properties of rubber. Minimum attainab pressure and optimum ascentional force are calculated and their effect on height performance discussed. Practical hints on how to attach instruments and how to handle balloons before launchi are included. *Subject Headings:* **1. Sounding balloons 2. Balloon performance.**

5E–63 551.507.321:551.510.53:629.

Neue Augsburger Zeitung, **Professor Piccards Forschungsflug in die Stratosphäre.** [Profess Piccard's exploratory ascent into the stratosphere.] Augsburg, **1931.** 128 p. 50 plates, 2 por **DWB**—Piccard's historic flight on May 27, 1931 is described in every detail. The account includ biographical sketches, popular scientific explanations and narrative accounts. Various phases of t preparations and flight are illustrated. Technical details on the stratosphere balloon "F.N.R.S and its performance are given on p. 15, 38–47 and 89–96. The balloon log is presented on p. 101–11 *Subject Headings:* **1. Manned balloon ascents 2. Stratospheric research 3. Free balloons. Piccard, August.**

5E–64 551.507.312

Wigand, A., **Hochfahrten von Registrierballonen.** [High flights of sounding balloons.] *Bi träge zur Physik der freien Atmosphäre*, 17(4):286–289, **1931.** 2 figs., ref. **DLC**—Results of resear conducted at the Meteorological Research Institute of the Deutsche Seewarte are briefly report The research was concerned with various properties of balloons, (especially their elastic properties

with a view of constructing balloons which would reach great heights. A curve showing dilatability and tear resistivity as a function of temperature is presented and discussed. Highest altitude reached as a result of this research was 35,900 m. *Subject Headings:* **1. Balloon research 2. Balloon performance 3. Balloon height maxima 4. Sounding balloons.**

1933

5E–65 551.507.321.2

Britton, C. E., **High pilot-balloon ascents at Shoeburyness.** *Meteorological Magazine*, London, 68(810):144, July **1933. DLC**—A flight performed by a 750-gram pilot balloon (followed with double theodolite) is reported to have reached 57,000 ft in 53 min. *Subject Headings:* **1. Pilot balloons 2. Balloon performance 3. Balloon ascension rates.**

5E–66 551.507.321.2(09)

Hergesell, Hugo, **Der erste Registrierballonaufstieg in hohen arktischen Breiten.** [The first sounding-balloon ascent in high Arctic latitudes.] *Beiträge zur Physik der freien Atmosphäre*, 20(4):261–268, **1933. DLC**—As a contribution of historical interest the author describes the first sounding ascent in the Arctic from the German vessel "Mainz" in Aug. 1910. The report contains a description of the tandem balloon technique initiated by the author. In this technique two balloons are linked together by an electrically controlled hook, which releases one of the balloons at pre-determined times. Specifications of balloons and equipment are included. *Subject Headings:* **1. Sounding balloons 2. Tandem balloons 3. History of meteorology 4. Marine aerological observations 5. Arctic Ocean.**

5E–67 551.558.1:551.507.321.2

Höhndorf, Fritz and Marquardt, R., **Thermische Vertikalbewegungen nach Schwebeballon-Vermessungen.** [Thermals observed with no-lift balloons.] *Beiträge zur Physik der freien Atmosphäre*, 21(2):147–168, **1933.** 20 figs., 3 tables, 13 refs. **DLC**—In section II (p. 150–155) the author discusses the no-lift balloon technique with particular attention to the various dynamic factors affecting its accuracy. *Subject Headings:* **1. Thermals 2. No-lift balloons.**

1935

5E–68 551.507.312.2

Berger, P., **Quelques propriétés physiques du caoutchouc des ballons-pilotes.** [Physical properties of pilot balloon rubber.] *Switzerland. Meteorologische Zentralanstalt, Annalen*, 72, Anhang No. 10, **1935.** 2 p. refs. **DLC**—The physical properties of balloon rubber largely affect the aerodynamic behavior of balloons. The author investigates two of the physical characteristics of rubber: 1) tensions as functions of elongation and temperature and 2) relaxation. Experimental investigation of these phenomena is reported. Variations of rate of ascent, of lift and other properties of balloons are discussed in connection with the physical properties of balloon rubber. *Subject Headings:* **1. Balloon research 2. Balloon fabrics 3. Pilot balloons.**

5E–69 551.507.321.4 551.507.351

Kleinschmidt, Ernst and Huss, Ed., **Fesselaufstiege vom Schiff aus.** [Captive ascents from ships.] (In: Kleinschmidt, E. (*ed.*), **Handbuch der meteorologischen Instrumente und ihrer Auswertung.** Berlin, **1935.** p. 520–538. 14 figs., refs.) **DLC**—The author sums up all details of equipment and operations connected with captive ascents at sea. Included in the description are the ship and its equipment, operation of kites, operation of captive balloons, suspension of meteorographs, and calculation of wind from measurements on a moving ship. The paper is based on practical experience, mostly gained on Lake Constance. *Subject Headings:* **1. Captive balloons 2. Kites 3. Marine aerological observations.**

5E–70 551.507.321.4 551.507.351

Kopp, W., **Fesselaufstiege von Land aus.** [Captive ascents over land.] (In: Kleinschmidt, E. (*ed.*), **Handbuch der meteorologischen Instrumente und ihrer Auswertung.** Berlin, **1935.** p. 473–520. 32 figs., 6 tables, refs.) **DLC**—Equipment for captive ascents and its operation is described in all technical detail. The equipment specified and illustrated includes kites of various type, wiring and winches. The operation of captive balloons (with special attention to operations in the Arctic) is discussed on p. 516–520. *Subject Headings:* **1. Captive balloons 2. Kites.**

5E–71 551.507.321.2

Kustov, V. F., **K voprosu ob izuchenii ballonnykh tkaneĭ.** [On the question of the study of balloon envelope fabrics.] (In: Vsesoiuznaia konferentsiia po izucheniiu stratosfery, Leningrad,

1934, **Trudy. 1935.** p. 695–701. table, 42 refs.) English version in its **Proceedings of the All-Union Conference for the Study of the Stratosphere, 1938.** p. 265–271. **DLC**—The aptitude of rubbered, varnished and mixed fabrics to meet the requirements of strength, minimum permeability and minimum weight is discussed in general and in relation to atmospheric and stratospheric conditions. Interferometer tests of balloon fabric permeability under vacuum, gamma ray and oxygen exposure are described. Results of the experiments appear to indicate that there is no significant change in the permeability of fabrics during the first 20 hours of exposure to atmospheric or stratospheric conditions. *Subject Headings:* **1. Balloon fabric permeability 2. Weathering of materials.**

5E–72 551.507.321:551.510.53:629.13

National Geographic Society, Washington, D. C., **The National Geographic Society—U. S. Army Air Corps stratosphere flight of 1934 in the balloon "Explorer."** *Its Contributed Technical Papers, Stratosphere Series*, No. 1, **1935.** 122 p. figs., refs., eqs. **DWB**—A series of articles dealing with various aspects of the flight in which the 3,000,000 cu ft balloon "Explorer" reached a height of 60,000 ft. Several of the articles contain details of construction and performance. Particularly good technical information is given in a report by the National Bureau of Standards on tests of fabric from the balloon (p. 83–89), a paper by KARL ARNSTEIN (Goodyear-Zeppelin Corp.) on the design of the balloon with detailed engineering specifications (p. 95–109) and the report of the Joint Board of Review appointed to investigate the causes of the balloon's failure (p. 71–82). *Subject Headings:* **1. Manned balloon ascents 2. Stratospheric research. I. U. S. National Bureau of Standards II. Arnstein, Karl.**

5E–73 551.507.321.2:551.510.53

Regener, Erich, **Erfahrungen und Ergebnisse mit Registrierballonen und Registrierapparaten in der Stratosphäre.** [Experiences and results obtained with sounding balloons and recording instruments in the stratosphere.] *Beiträge zur Physik der freien Atmosphäre*, 22(4):249–260. **1935.** 4 figs., refs. **DLC**—Detailed description of balloons and methods used in 24 ascents with various equipment. Balloons ranging from 4 to 12 kg in weight, 2.5 to 3.5 m in diameter and 0.1 to 0.3 mm in thickness were used in series of 2, 3 or 4 tied together. Among other details experienced during the operations the author discusses the destructive effect of ozone on rubber fabrics as shown in flight and in experiments conducted at the Physical Institute of Stuttgart, Germany. *Subject Headings:* **1. Sounding balloons 2. Balloon clusters 3. Stratospheric research 4. Ozone effect on balloons.**

5E–74 551.507.32

Reger, J., **Technik der Gummiballone.** [The rubber balloon technique.] (In: Kleinschmidt, Ernst (*ed.*), **Handbuch der meteorologischen Instrumente und ihrer Auswertung.** Berlin, 1935. p. 434–446. 6 figs., 5 tables, refs.) **DLC**—The status of aerological research by means of balloons is summed up in the following arrangement: a) historical development of balloon techniques, b) the rubber balloon, its manufacturing and handling (balloons made of cut sheet; the dipping technique of seamless balloon manufacturing; balloons made of rolled sheet), c) maximum heights attainable with closed rubber balloons (tables of bursting heights for pilots and sounding balloons), d) sounding balloon ascents (parachute technique; tandem arrangement, clusters; controlled altitude ascents; choice of ascension rate). *Subject Heading:* **1. Balloon research.**

5E–75 551.510.5

Rynin, N. A., **Metody osvoeniia stratosfery.** [Methods of mastering the stratosphere.] (In: Vsesoiuznaia konferentsiia po izucheniiu stratosfery, Leningrad 1934. **Trudy. 1935.** p. 621–680. 46 figs., tables.) English version in its **Proceedings of the All-Union Conference for the Study of the Stratosphere, 1938.** p. 261–264. 2 figs. **DLC**—Among other means of upper air investigation Russian stratosphere balloons, including Stratostats "OS-OAKh-I" and "USSR," are described. "OS-OAKh-I" had a volume of 24,920 cu m, a diameter of 36.24 m. It was made of 25 trapezoidal runs of cloth of two varieties, i.e. the upper part of double-ply rubberized fabric and the lower part of single-ply fabric. The slightly smaller "USSR" had an upper part of single-ply rubberized fabric (percale A) and a lower part of finer rubbered fabric (percale B), the top of the envelope being reinforced with a three-ply fabric. Tests of the fabric proved good resistivity to ultraviolet ray and temperature changes. The fabrics had inner and outer rubber coating, the latter being protected with paint. *Subject Headings:* **1. Free balloons 2. Stratospheric research.**

5E–76 551.507.32

Sager, T. P., **Rubber substitutes as coatings for balloon fabrics.** *Journal of the Aeronautical Sciences*, N. Y., 3(2):63–65, Nov. **1935.** 2 tables, refs. **DLC**—A discussion of the materials and balloon fabrics in general is included. The permeabilities to hydrogen of balloon fabrics coated

with rubber substitutes and rubber-like materials are given. All have much lower permeabilities than rubberized fabric. *Subject Heading:* **1. Balloon fabrics.**—*Author's abstract.*

1936

5E–77 551.507.312.2

Berger, Pierre, **Le caoutchouc des ballons-pilotes aux points de vue physique et chimique.** [Physical and chemical properties of pilot balloon rubber.] *Helvetica Physica Acta*, Basel, 9(5):372–388, **1936.** 4 figs., 5 tables, refs. **DLC**—Results of experimental measurements of the inner pressure of rubber balloons are tabulated. Balloons of different size, weight and color were inflated several times to varying sizes under different atmospheric pressure and temperature conditions. Both non-vulcanized and vulcanized rubber was used. Stretching of the fabrics under prolonged inflation, form of bursting, etc., are discussed. The author suggests that the usual failure of sounding balloons at a height of 32–34 km may be due to the effect of ozone. He also thinks that inversions are probably responsible for repeated premature burstings. *Subject Headings:* **1. Balloon research 2. Balloon fabrics 3. Sounding balloons 4. Ozone effect on balloons.**

5E–78 551.501.7:551.507.3

Molchanov, P. A., **Metody issledovaniia svobodnoĭ atmosfery.** [Methods of investigating the free atmosphere.] 2nd ed. Moscow, Leningrad, **1936.** 264 p. 158 figs., tables, eqs. **DWB**—This handbook of aerological methods contains detailed theoretical and practical instructions on measurement by means of: a) pilot balloons and b) recording instruments. Included are descriptions of instrument-carrying vehicles, such as kites, captive balloons, kite balloons, manned balloons, sounding balloons and airplanes. *Subject Headings:* **1. Upper air observation 2. Balloons.**

5E–79 551.507.321:551.510.53:629.13

National Geographic Society, Washington, D. C., **The National Geographic Society—U. S. Army Corps Stratosphere Flight of 1935 in the balloon "Explorer II."** Its *Contributed Technical Papers, Stratosphere Series*, No. 2, **1936.** 278 p. figs., refs., eqs. **DWB**—A collection of detailed accounts on all aspects of the flight in which the 3,700,000 cu ft helium-inflated balloon "Explorer II" reached a record altitude of 13.7 miles on Nov. 11, 1935. Details on material, construction and performance of the balloon are contained in several of the articles, especially in the comprehensive technical treatments given in Pt. V (p. 240–267). *Subject Headings:* **1. Manned balloon ascents 2. Stratospheric research 3. Free balloons.**

1937

5E–80 551.507.321

Akerman, John D. and Piccard, Jean F., **Upper air study by means of balloons and the radio meteorograph.** *Journal of the Aeronautical Sciences*, 4(8):332–337, June **1937.** 3 figs., 8 plates. **DLC**—The constant-altitude 73 cu m cellophane balloon developed at the Franklin Institute and the University of Minnesota is described. This balloon, designed for the purpose of carrying a heavy load at an altitude of approximately 10 miles for a prolonged period of time, covered a distance of 613 miles in 10 hours on June 24, 1936. Instead of cellophane balloons a train of six Dewey-Almy rubber balloons was used in winter. It was found that the train can float at approximately ceiling altitude for several hours if properly coupled and inflated. Technical details of both cellophane balloon and Dewey-Almy balloon train are shown in diagrams. *Subject Headings:* **1. Constant level balloons 2. Plastic balloons 3. Balloon clusters.**

5E–81 551.507.321.2

Cosyns, M., **Belgian stratosphere balloon experiment.** *Nature*, London, 140(3532):54, July 10, **1937.** fig. **DWB**—A large balloon able to reach 19 miles is only one-tenth filled on descent to 10 miles, and is liable to flap. This can be prevented by allowing air to flow in, but the sun heating the air causes sufficient expansion to stop descent. This was overcome by allowing air to escape upwards through a tube as soon as it was warmed. This worked well with a 100 ft diameter balloon but would not be practicable with a 200 ft balloon. An experiment using auxiliary heating by propane gas failed through accident. *Subject Headings:* **1. Sounding balloons 2. Balloon performance.**—*C.E.P.B.*

5E–82 551.508.25:551.507.321.2

Johnson, Thomas H., **Radio-transmission of coincidence counter cosmic-ray measurements in the stratosphere.** *Franklin Institute, Philadelphia, Journal*, 223(3):339–354. March **1937.** 7 figs., refs., 5 eqs. **DLC**—Dealing with recent progress in cosmic ray measurement techniques the author describes 350 g cellophane balloons designed to carry 4 kg of useful load to the 30 mm pressure level.

Characteristics, performance and handling of the balloons are discussed and illustrated (p. 347–354). *Subject Headings:* **1. Plastic balloons 2. Sounding balloons 3. Cosmic ray measurement 4. Stratospheric research.**

5E–83 551.508.25:551.507.321.1

Keen, C. D., **High altitude test of radio-equipped cosmic ray meter.** *Franklin Institute, Philadelphia, Journal,* 223(3):355–373, March **1937.** 9 figs., refs. **DLC**—This account of a cosmic-ray measurement flight includes description (p. 366–371) and illustration of balloons and their performance. Three 8-ft balloons made of slightly vulcanized rubber weighing 7–8 lbs and capable of expanding to 15 ft in diameter were tied together to carry a useful load of 41 lbs to a maximum height of 52,000 ft. *Subject Headings:* **1. Sounding balloons 2. Balloon clusters 3. Cosmic ray measurement 4. Stratospheric research.**

5E–84 551.507.321.

Rehbock, Arnolf P., **Faster-ascending pilot balloons.** *American Meteorological Society, Bulletin* 18(11):356–359, Nov. **1937.** 2 figs. **DLC**—Advantages of faster ascension are stressed. Technical details and performance characteristics of DAREX No. 100 14-in. pilot balloons (Dewey & Almy Chemical Co.) are described and graphically illustrated. These new balloons are claimed to reach 40,000 ft if inflated to a lift producing a vertical velocity of 6 m/sec. (*See also* inner front cover for advertisement of "New Darex meteorological balloons" in four standard sizes.) *Subject Headings:* **1. Pilot balloons 2. Balloon performance 3. Balloon ascension rates.**

5E–85 551.507.32

Väisälä, Vilho, **Über die Elastizität der Kautschukballone. I. Überdruck, Spannung und Festigkeit.** [Elastic properties of rubber balloons. I. Overpressure, tension and resistance.] *Helsinki. Universitet. Meteorologian Laitos, Mitteilungen,* 38, **1937. DWB.** Reprinted from *Suomalainen Tiedeakatemia, Helsinki, Toimituksia,* 48(8), **1937.** 9 p. 2 figs., 6 tables, 17 eqs. **DLC**—The elastic tension of balloon rubber and overpressure in a balloon are investigated as functions of expansion, disregarding the effect of temperature and of relaxation. Both theoretical and experimental results are included. *Subject Heading:* **1. Balloon fabrics.**

1938

5E–86 551.558:551.507.321

Mirrlees, S. T. A., **Note on experiments with no-lift balloons at Leuchars, Fife.** *Meteorological Magazine,* London, 73(872):204–207, Sept. **1938.** table. Also: Dines, J. S., **Experiments with no-lift balloons.** *Ibid.,* 73(873):241–242, Oct. **1938. DLC**—Several details connected with the operation of no-lift balloons are discussed. Results of flights are tabulated. DINES stresses the difficulty arising from the effect of sunshine on the equilibrium of no-lift balloons. *Subject Heading:* **1. No-lift balloons. I. Dines, J. S.**

5E–87 551.507.321

Wenstrom, William Holmes, **Notes on small captive balloons for low altitudes with remarks on airport fog situations.** *American Meteorological Society, Bulletin,* 19(2):55–59, Feb. **1938.** 2 figs. **DLC**—The method of lower atmospheric sounding described in this paper eliminates all threat to aviation. Balloon, instruments and captive string are of light construction, not capable of causing injury to airplanes. The balloons used are 16-in. Dewey & Almy Model 100 pilot balloons inflated with hydrogen to a free lift between 10 and 40 oz. Tests made with this technique are discussed and illustrated. *Subject Headings:* **1. Pilot balloons 2. Captive balloons 3. Airport observation.**

1939

5E–88 551.507.321

Schereschewsky, Ph., **Un nouveau record français d'altitude; Un ballon météorologique dépasse 30 kilomètres.** [New French height record; a meteorological balloon rises above 30 km.] *Nature,* Paris, 67(3040):10–12, Jan. 1, **1939.** fig. **DLC**—The 31.5 km ascent of Nov. 26, 1938, at Saint-Cyr is described. The balloon used was 80 cm in diameter with a free lift of 3 kg. *Subject Headings:* **1. Sounding balloons 2. Balloon performance 3. Balloon height maxima.**

5E–89 551.507.321:551.510.

Upson, Ralph H., **Stresses in a partially inflated free balloon—with notes on optimum design and performance for stratosphere exploration.** *Journal of the Aeronautical Sciences,* N. Y., 6(4):151–156, Feb. **1939.** 2 figs., 19 eqs. **DLC**—After calculating tensions in an inexpansible balloon and discussing their effect on height performance the author concludes that "an unmanned balloon

modest size could be sent up to where the relative density is less than one one-thousandth, or an altitude of some thirty miles." *Subject Headings:* **1. Free balloons 2. Stratospheric research.**

1941

5E–90 551.507.321.2

Eisele, Karl, **Registrierballone aus Transparentfolien.** [Sounding balloons made of transparent fabrics.] *Luftfahrtforschung*, Munich, 18(4):147–154, April 22, **1941.** 9 figs., 6 eqs., refs. **DLC**—Causes of failure of rubber balloons in great height (e.g. defective fabric, influence of ultraviolet radiation and of ozone, and low temperature) are reviewed. Balloons made of the 0.0065 mm cellulose fabric "Cuprophan 10" are described and their characteristics discussed in detail. These balloons are dyed black for protection against the destructive effect of cold. Preliminary flight tests made with such balloons (having volumes of 27 and 370 cu m) are reported. Since Cuprophan 10 has a lighter areal weight than rubber stretched to bursting capacity, balloons made of this fabric are expected to reach altitudes up to 40 km. The outbreak of hostilities prevented test-flight verification of this expectation, even though balloons with volumes up to 1,000 cu m were available. *Subject Headings:* **1. Plastic balloons 2. Sounding balloons 3. Balloon performance 4. Balloon color.**

5E–91 551.507.321.2

Regener, Erich, **Ballone mit grosser Steiggeschwindigkeit und Thermograph von geringer thermischer Trägheit.** [Fast-ascending balloons and thermograph with short lag time.] *Deutsche Akademie der Luftfahrtforschung, Berlin, Schriften*, No. 37:3–13, Jan. 17, **1941.** 8 figs., refs. **DLC**—Cigar-shaped balloons made of Cuprophan, a non-expansible, commercially distributed viscose fabric, are described. Volume: 8 cu m; thickness of fabric: 0.01 mm; net weight: 1100 g. These balloons have the advantage of high rate of ascent. Their large initial volume presents difficulties in launching; their maximum attainable height is limited by their constant size. A schematic diagram, an illustration and an ascent curve showing maximum heights of 16 and 12 km without load and with load of 800 g respectively, are presented. Cuprophane balloons of 120 and 400 cu m designed for attainment of considerable height (and not for high rate of ascent) are mentioned. *Subject Headings:* **1. Plastic balloons 2. Sounding balloons 3. Balloon performance 4. Balloon shapes 5. Thermographs.**

1942

5E–92 551.507.321.2

New "Met" balloons. *Flight*, London, 41(1729):136, Feb. 12, **1942. DLC**—Five-line note reporting from "Behind the Lines" the use by the German Air Force of "Cuprophan" for sounding balloons. This material is 0.0065 mm thick; it does not deteriorate under the influence of ultraviolet rays, rain or cold. A fine net protects the balloons. An altitude of 24 miles was claimed. (For detailed information concerning these balloons *see item* 5E–90 above.) *Subject Headings:* **1. Plastic balloons 2. Balloon height maxima.**

5E–93 551.507.312.2

Schallamach, Adolf, **Crystallization in an inflated rubber balloon.** *Nature*, London, 149(3769):112, Jan. 24, **1942.** 3 figs. **DLC**—Balloons of pure vulcanized latex, 1 cm diameter and 0.1 or 0.6 mm thickness when slack, were inflated to 3–4 cm and examined by X-ray. This showed oriented crystallization with the shorter *a*-axis normal to the skin, especially in the thinner balloon, and the *b*-axis in the direction of the main valency chain. *Subject Heading:* **1. Balloon fabrics.**—*C.E.P.B.*

1944

5E–94 551.507.321.2

Berger, Pierre, **Pression à l'intérieur d'un ballon en Cellux.** [Inside pressure of cellux balloons.] *Schweizerische Naturforschende Gesellschaft, Verhandlungen*, 124:107, Sept. **1944.** Also: **Allongement et résistence à la rupture du Cellux 305, en fonction de la température.** [Elongation and tear resistence of Cellux 305, as a function of temperature.] *Ibid.*, p. 107–109. And: **Paradoxe de la vitesse et de la force ascensionelle des ballons en Cellux.** [Paradox of the rate of ascent and free lift of cellux balloons.] *Ibid.*, p. 109. And: **Déformation en vol des ballons en Cellux.** [Deformation during flight of cellux balloons.] *Ibid.*, p. 109–110. **DLC**—Brief notes dealing with various properties of the plastic balloons used in the Swiss meteorological service. (For more complete information *see item* 5E–96 below.) *Subject Headings:* **1. Plastic balloons 2. Balloon fabrics 3. Sounding balloons.**

5E–95 551.507.321.2

Müller, Hans Gerhard and Utzschneider, Werner, **Untersuchungen über die Eigenschaften aerologischer Messballone.** [Investigations on the properties of aerological sounding balloons.]

Germany. Reichsamt für Wetterdienst, Forschungs- und Erfahrungsberichte, Ser. A, No. 24, 194
17 p. 23 figs., refs. **DWB**—Report on results of laboratory tests of the stress resistance of natura
and synthetic rubber fabrics and on experiments on balloon performance in flight. The laboratory
experiments included inflation tests and tractive elongation tests. Requirements of fabrics to b
used as pilot or sounding balloons, the influence of cold, the effect of rubber thickness, etc., ar
discussed. Elongation curves are presented for natural and various types of synthetic rubber. I
discussing flight results the author deals with temperature at the time of bursting, measurement o
the inner pressure, and heating of synthetic rubber balloons. *Subject Headings:* **1. Balloon fabrics
2. Balloon performance.**

1945

5E–96 551.507.321.

Berger, Pierre, **Ballons en Cellux.** [Cellux balloons.] *Archives des Sciences Physiques
Naturelles*, Geneva, 27:26–55; 59–78, Jan./Feb.; March/April, **1945.** 21 figs., 25 tables, refs. **DLC**—
In 1942 the scarcity of rubber obliged the Swiss Meteorological Service to perform soundings with
balloons made of some other fabric. A non-expansible cellulose fabric, "cellux," was chosen. Th
author, who was in charge of production, describes the manufacturing process. Details are given
on the chemical composition of cellux, on its physical properties under influence of heat, pressure
elongation, moisture, light, etc. The form of balloons, rates of ascent, maximum heights attained
deformation during flight and other details of performance are discussed. *Subject Headings:*
1. Plastic balloons 2. Sounding balloons 3. Balloon fabrics 4. Balloon performance.

5E–97 551.507.321.2:551.521.

Berger, Pierre, **Effets de l'insolation sur le cellux et sondages aérologiques.** [Effect of insola
tion on cellux and aerological soundings.] *Schweizerische Naturforschende Gesellschaft, Verhand
lungen*, 125:138–139, Sept. **1945.** Also: **Elévation de température par traction dans le cellux**
[Temperature increase due to traction in cellux.] *Ibid.*, p. 139. **DLC**—In the first note the autho
states that the color of balloons has hardly any effect on their warming through insolation. Th
effect of balloon temperature on the accuracy of temperature measurements is discussed.—Th
second note gives figures on the thermal effect of elongation of cellux fabrics. (For more comple
information on the subject *see item* 5E–96 above.) *Subject Headings:* **1. Plastic balloons 2. Sound
ing balloons 3. Balloon temperature.**

5E–98 551.507.32

Habib, Emile E. and Gott, Gordon E., **Manufacture of articles from liquid dispersions.** *U.
Patent Office, Patent* No. 2,378,882, June 19, **1945.** [3 p.]+plate. **DP**—In this patent (assigne
to Dewey & Almy Chemical Co.) an improvement in dipping-type production of meteorologica
radiosonde and emergency life-saving balloons is specified. It consists essentially in removing th
balloon from the mold and inflating it while the rubber gel is still plastic from the interstitial presen
of water. *Subject Headings:* **1. Balloons 2. Patents 3. Balloon manufacturing patents. I. Dewe
and Almy Chemical Co.**

1946

5E–99 551.507.32 551.508.82

Korff, S. A. and Amermesh, B., **New cosmic ray radio-sonde techniques.** *Franklin Institut
Philadelphia, Journal*, 241(5):355–368, May **1946.** 7 figs., 2 refs. **DLC, DWB**—In order to car
heavy loads of cosmic ray and other aerological instruments to great heights, clusters of as many
70 balloons were launched from the University of Chicago grounds. Construction of instrument
radio circuits, launching procedures, flight experience, recovery of equipment and other deta
of the program are described and illustrated. (*Same item as* 7–20, July 1950, *MAB.*) *Subje
Headings:* **1. Sounding balloons 2. Radiosondes 3. Cosmic ray instruments. 4. Balloon cluste
—M.R.**

5E–100 551.507.321

Law, L. B., **Notes on improving the pilot balloon lantern.** *American Meteorological Societ
Bulletin*, 27(6):347–348, June **1946.** fig., 5 refs. **DLC**—First routine pilot balloon soundings
U. S. A. began in 1918, and first routine night-time soundings with lanterns in 1926. Suggestions f
improving lanterns include: a) use of a truncated cone shape instead of cylindrical, b) cellopha
instead of tissue paper sides, c) metal foil reflectors under top of lantern and d) use of impregnate
candle wicks to produce different colors of flames to contrast against various sky conditions. *Subj
Headings:* **1. Balloon accessories 2. Pilot balloons 3. Balloon illumination.**—*M.R.*

1947

5E–101 551.507.321

Ashford, O. M., **High altitude sounding balloons.** *Great Britain. Meteorological Resear
Committee, M.R.P.*, 341, April 28, **1947.** 4 p. table. **DWB**—It was estimated that a 10 kg ballo

pable of expanding to 40 ft diameter would be needed to carry 1 kg to 100,000 ft. Four 4,500 gm alloons reached average height of 71,000 ft at Larkhill. Two 500 gm balloons neck to neck in ndem reached heights of 49,000 to 83,000 ft. Orange balloons had slightly lower bursting height an white balloons. *Subject Headings:* **1. Sounding balloons 2. Balloon performance 3. Tandem alloons 4. Balloon color 5. Balloon loads 6. Larkhill, England.**—*C.E.P.B.*

5E–102 551.507.321.2

Great Britain. British Intelligence Objectives Sub-committee, **Materials for construction of eteorological balloons.** B.I.O.S. Final Report No. 1104, Item Nos. 9 and 22, **1947.** 5 p. Mimeo. **B-MO**—Describes interviews in Germany 1945–46. Prof. Grundmann (Brunswick), described om memory tests on materials, probably synthetic rubber. Dr. Erich Regener stated that: regenerated cellulose film was no good at low temperatures; b) Cuprophane was better but had no tretch in the cold; c) Perfol (Agfa, 40 g/m²) was found to be very good. Pear-shaped balloons with tabilizing fins rose at 600 m/min to 18–19 km. Height of spherical balloons was found up to 23 km y measuring diameter with a micro-screw theodolite. *Subject Headings:* **1. Balloon fabrics Balloon performance 3. Balloon shapes.**—*C.E.P.B.*

5E–103 551.507.321.2

Wickham, J. C. W., **High pilot-balloon ascents at Piarco, Trinidad.** *Meteorological Magazine*, London, 76(905):251–253, Nov. **1947.** table. **DWB**—From twelve months' experience in pilot alloon operation at Piarco, Trinidad, the author reports ascents surprisingly high for the region onsidering that it is located in a maritime air mass and is subject to tropical weather. A table 11 ascents in excess of a theoretical height of 40,000 ft is presented. The maximum height of 3,000 ft was reached in Feb. 1947. *Subject Headings:* **1. Pilot balloons 2. Balloon performance Trinidad.**

1948

5E–104 551.507.321.2

Beynon, A., **High pilot-balloon ascents at Oakes Field, Nassau, Bahamas.** *Meteorological Magazine*, London, 77(916):229–231, Oct. **1948.** table. **DWB**—In reference to a note by J. C. W. Wickham (*see item* 5E–103 above) in which surprisingly high pilot balloon ascents were reported om the maritime tropical region of Trinidad, the author contributes data on high ascents at Oakes ield (also in maritime air) by presenting a table of 10 ascents, featuring a maximum height of over 7,000 ft in Dec. 1946. *Subject Headings:* **1. Pilot balloons 2. Balloon performance 3. Bahama slands.**

5E–105 551.507.321

Spilhaus, Athelstan F., Schneider, C. S. and Moore, C. B., **Controlled-altitude free balloons.** *Journal of Meteorology*, 5(4):130–137, Aug. **1948.** 10 figs., ref. **DLC**—The results of an experimental program to develop balloons with associated control devices, which will float at constant ressure in the atmosphere, are given. Newly developed plastic balloons and automatic ballast quipment are described. Examples of successful controlled-altitude flights are shown, together ith a preliminary analysis of their trajectories. The constant-level balloon may provide data not btainable from an ordinary pilot-balloon network. Future possibilities and plans for its use are ndicated. *Subject Headings:* **1. Constant level balloons 2. Balloon trajectories 3. Plastic alloons.**

5E–106 551.507.321.2

U. S. Air Force. Air Proving Ground, **Comparative and functional test of the U. S. Weather Bureau 500-gram and standard balloon ML-391/AM 1400-gram.** Project No. 34824-5, Report, Dec. 9, **1948.** 44 p. tables, photos. **DWB**—Conclusion is that the 1400 gram balloon is superior o the 500 gram balloon because it is better constructed and bursts at a higher altitude in the daytime. However, the 500 gram balloon reaches higher altitude at night and takes less gas and a maller inflation shelter. Both show the same ascension rate characteristics. The 1400 gram alloon is 5 ft in diameter and expands to 6¼ ft when inflated and lifts 3200 grams. Of the 21 larger balloons released in the daytime, 20% reached 100,000 ft and 50% reached 90,000 ft. One reached 26,000 ft. (*Same item as* 3.7–55, July 1952, *MAB.*) *Subject Headings:* **1. Sounding balloons 2. Balloon comparisons 3. Balloon ascension rates 4. Balloon height maxima. I. Project No. 34824-5.**—*M.R.*

1949

5E–107 551.507.321.2

Groen, P., **De hoogste ballonoplating met instrumenten.** [The highest instrument-carrying balloon ascent.] *Hemel en Dampkring*, 47:32, **1949.** **DLC**—Brief article reporting the 43.5 km ascent claimed by a unit of the U. S. Army at Fort Monmouth on Sept. 28, 1949. The ascent

constitutes a new record for instrument-carrying balloons. *Subject Headings:* **1. Sounding balloo 2. Balloon performance 3. Balloon height maxima.**

5E–108 551.507.3

Miller, Donald J., **Meteorological balloon or similar article and method of making the sam** *U. S. Patent Office, Patent* No. 2,461,072, Feb. 8, **1949.** [3 p.]+plate. 5 refs. **DP**—The meth of manufacturing provided by this invention finds a solution to the problem of removing the ballo from its forming member without unduly stretching the neck piece. The patent was assigned American Anode, Inc. *Subject Headings:* **1. Balloons 2. Patents 3. Balloon manufacturi patents. I. American Anode, Inc.**

1950

5E–109 551.507.32

Constant height balloons. *Weather,* 5(10):356, Oct. **1950.** 2 photos. **DWB**—Balloo designed to keep cosmic ray apparatus for several hours at 65,000 ft. or higher. (*Same item* 2.2–19, Feb. 1951, *MAB.*) *Subject Heading:* **1. Constant level balloons.**

5E–110 551.50

Droessler, Earl G., **"Skyhook" plastic balloons for high-altitude soundings.** *American M teorological Society, Bulletin,* 31(6):191–193, June **1950.** 2 figs., 2 refs. **DWB, MH-BH**—Descr tion of construction, performance and observations made with the nonstretchable polyethyle balloon (129′ long; 73 ft. in diameter and carrying 80 pounds of "payload"). Data on win temperature, humidity, ozone, solar spectrum, cosmic rays, etc. up to 100,000 ft have been collec and experience gained has been valuable in developing constant level balloons. (*Same item as* 8– Aug. 1950, *MAB.*) *Subject Headings:* **1. Skyhook balloons 2. Plastic balloons 3. Constant le balloons 4. Balloon performance.**—*M.R.*

5E–111 551.521.64:551.50

Ferrand, P.; Morellet, D. and Bousser, F., **Technique de ballons-sonde groupes pour l'étude rayonnement cosmique en haute atmosphère.** [Cluster sounding balloon technique for the stu of cosmic radiation in the upper atmosphere.] *Annales de Géophysique,* 6(3):217–224, July/Se **1950.** 4 figs., 3 photos, eqs. **MH-BH**—At elevations of 20,000 m, at which primary cosmic radiat can be studied more precisely, special problems are encountered in the use of photographic pla with thick emulsions, in the use of cluster balloons and of electronic devices. The author describ 1) a method of maintaining a constant temperature for the photographic plates; 2) radioson technique and goniometric locations and 3) the release of clusters of balloons. (*Same item as* 3.6–1 June 1952, *MAB.*) *Subject Headings:* **1. Cosmic radiation 2. Upper air observation 3. Ballo clusters 4. Sounding balloons 5. Photometry.**—*I.L.D.*

5E–112 551.50

Isom, Langley W., **Constant-level balloon.** *U. S. Patent Office, Patent* No. 2,524,567, Oct. **1950.** [3 p.]+plate. 4 refs. **DP**—An elastic constant level balloon is described and illustrat Its valve is controlled by a non-elastic auxiliary balloon. (Patent assigned to Dewey & Al Chemical Co.) *Subject Headings:* **1. Constant level balloons 2. Patents 3. Constant level ball patents. I. Dewey and Almy Chemical Co.**

5E–113 551.5

Karol', B. P., **D. I. Mendeleev i meteorologiia.** [D. I. Mendeleev and meteorology.] Len grad, Gidrometizdat., **1950.** 35 p. fig., photo, 33 refs. **DLC**—This biography and discussion meteorological contributions of the famous Russian scientist Dimitriĭ Ivanovich Mendeleev (18 1907) includes reference to his merits in development of manned balloons and an account of scientific ascent in Aug. 1887. *Subject Headings:* **1. Biography 2. Mendeleev, Dimitriĭ Ivanov 3. Manned balloon ascents.**

5E–114 551.507.321:551.50

Murray, W. D.; Schneider, C. S. and Smith, J. R., **Development and utilization of consta level balloons.** *American Geophysical Union, Transactions,* 31(6):843–848, Dec. **1950.** 5 fi table, 4 refs. **DWB**—The properties of plastic nonextensible balloons, which can be kept at const levels in the tropopause and low atmosphere for long periods of time (some have remained af for more than 50 hours while carrying a full load for over 6000 mi), are discussed. The loss of lif compensated for by the ballast flow which is controlled by an aneroid unit set to permit flow whene the balloon system descends to a prescribed pressure level. The mechanical control unit is descri and a diagram ballast control circuit is given. The use of such balloons in determining air trajecto and as a vehicle for carrying instruments to a desired level is discussed. A table giving data on

ationship between load and altitude for various balloon sizes and an example of a 200 mb trajectory dy are presented. (*Same item as* 2.5–27, May 1951, *MAB.*) *Subject Headings:* **1. Constant level lloons 2. Plastic balloons 3. Balloon trajectories.**—*I.L.D.*

5E–115 551.507.321

*New York University. College of Engineering. Research Div., **High altitude balloon tra-tory study.** Contract No. AF 19(122)-45, Technical Report No. 121.05, June 15, **1950.** 33 p. fold. leaves. photos., graphs, diagrs., tables, append. **DWB**—The equipment used in constant vel balloon flights between Aug. 1949 and April 1950, is described and illustrated in detail. Data llected are analyzed and a special analysis made of Trans-Atlantic flights. Special papers are itten on the calculation of geostrophic deviations, the possibility of forecasting constant level lloon trajectories and a comparison of geostrophic winds with constant level balloons. Detailed ta and charts are give for flights No. 119–149, including maps of the region from New Mexico east of the Mississippi River, showing the trajectory of each balloon and position every few nutes. No. 146 and 149 were found in Norway and North Africa, respectively. Several were eased at Rapid City, S. Dakota, and followed by aircraft based there or at St. Paul, Minn. Cali-ation charts and nomograms are given in appendix. *Subject Headings:* **1. Constant level balloons Geostrophic winds 3. Balloon trajectories. I. Murray, William D. II. Smith, James R. I. Emmons, Garner IV. Greenfield, S. M. V. Contract AF 19(122)-45.**—*M.R.*

5E–116 551.507.321

Spilhaus, Athelstan, **Constant level balloons.** *I.U.G.G. Association of Meteorology, Oslo 1948, ransactions,* 2:169–171, **1950. DWB**—1/1000″ polyethylene plastic balloons 20 ft in diameter for nstant level flights at 50,000 ft are the subject of this summary report. More than a dozen flights more than 20 hours were achieved (longest 36 hours). Smaller and larger balloons, including a -ft balloon, are also mentioned. In the discussion (p. 170–171) H. LANDSBERG reports 25 ascents 100,000–120,000 ft carried out at White Sands, N. M. *Subject Headings:* **1. Constant level alloons 2. Plastic balloons 3. Balloon research. I. Landsberg, H.**

5E–117 551.507.321.2

Schulze, Werner, **Platzhöhen von Radiosondenballonen und Ozongehalt der freien Atmosphäre.** [Bursting heights of sounding balloons and ozone content of upper atmosphere.] *Annalen der Meteorologie,* 3(1/2):42–48, Jan./Feb. **1950.** 2 figs., 5 tables. German and English summary p. 42. **WB**—Average bursting level of 350 g balloons rises from 112 mb with tropopause at 320–270 mb 93 mb with tropopause at 200–160 mb. For 500 g balloons bursting level rises from 80 to 67 mb. ariation of tropopause and bursting level are similar (highest in summer and in anticyclones). he relation is attributed to variations of ozone content of troposphere and sub-stratosphere, which increased by turbulence and convection when tropopause descends. Effect of temperature is egligible in comparison. Bursting levels are somewhat lower by day than night (effect of insolation). (*Same item as* 6–13, June 1950, *MAB.*) *Subject Headings:* **1. Sounding balloons 2. Atmospheric ructure 3. Balloon bursting height 4. Ozone effect on balloons.**—*C.E.P.B.*

5E–118 551.508.822:551.501.1(02)

U. S. Weather Bureau, **Manual of radiosonde observations.** Its *Circular P,* 6th ed., Wash., C., Jan. **1950.** Addenda up to June 1, **1953.** 184+p. figs., tables. Price **$1.00. DWB**—etailed instructions, tables and forms for operations connected with radiosonde observations. The anual includes brief paragraphs on balloons, dealing with their conditioning, handling, inflation, aling, shrouds, storage (cf. Index on p. 177 under "Balloons"). *Subject Headings:* **1. Radiosonde peration 2. Observers manuals 3. Balloon maintenance.**

5E–119 551.557:551.501.1(02)

U. S. Weather Bureau, **Manual of winds-aloft observations.** Its *Circular O,* 4th ed., Wash., C., July **1950.** Addenda up to July 1, **1952.** 66+p. figs., tables. Price **$1.00. DWB**—etailed practical instructions for all phases of operation of: a) pilot balloons, b) rabal and rawin,) marine pibals, rabals and rawins and d) forms and theodolites. *Subject Headings:* **1. Upper air ind measurement 2. Balloon observers manuals.**

5E–120 551.507.321

Winzen, Otto C., **Balloon construction.** *U. S. Patent Office, Patent* No. 2,526,719, Oct. 24, **950.** [6 p.+4 plates]. 15 figs., 6 refs. **DP**—This document contains technical specifications egarding construction of a balloon in which catenary ring and load net of the ordinary type is liminated by joining the gores together in such a manner that the load is carried by the joints or eams between the gores. The invention (assigned to General Mills, Inc.) is destined for strato-

sphere balloons which have to carry substantial loads in long flights. *Subject Headings:* **1. Plas balloons 2. High altitude balloons 3. Patents 4. Balloon manufacturing patents. I. Gene Mills, Inc.**

1951

5E–121 551.507.321.1:551.524

Court, Arnold, **Bursting of frozen balloons.** *American Meteorological Society, Bulletin*, 32(8 313–314, Oct. **1951. DLC, DWB, MH-BH**—The effect of low temperature on the bursting poi of balloons of various size and material is discussed. The phenomenon of a balloon's splitting in two hemispheres, which keep their shape for a few minutes, is considered. (*Same item as* 3.7–9 July 1952 *MAB.*) *Subject Headings:* **1. Pilot balloon bursting 2. Temperature effect on balloon**

5E–122 551.507.321:629.

The General Mills Aeronautical Research Laboratories. *American Meteorological Socie Bulletin*, 32(3):111–112, March **1951. MH-BH**—Development of enormous "sky-hook" balloo by General Mills is described and the balloon illustrated. These balloons have carried loads of 4 lbs. to >77,000 ft and 150 lbs. to >105,000 ft. (*Same item as* 3.1–38, Jan. 1952 *MAB.*) *Subj Headings:* **1. Skyhook balloons 2. Constant level balloons 3. Balloon height maxima 4. Ballo loads 5. General Mills Aeronautical Research Laboratories.**—*M.R.*

5E–123 551.507.3

†*New York University. College of Engineering. Research Div., **Constant level balloon proje** Contract W28-099-ac-241, Technical Reports No. [93.01]–93.03, April **1948**–March **1951.** 5 piec 62+; 79; 109; 70; 27 p. numerous figs., tables, refs. **DWB**—An extensive documentation on t constant level balloon research conducted by New York Univ. from 1946 to 1950. The repo include detailed data, descriptions, illustrations, discussions of fabrics, balloons, altitude cont equipment, auxiliary equipment, test flights, etc. Foremost in the research were the 7 and 20 0.001 inch Polyethylene balloons furnished by General Mills, Inc. The balloons were flown single units or in clusters. Performance requirements were: a) constant altitude (within 500 between 10 and 20 km, adjustable at 2 km intervals, b) duration of constant-level flight 6 to 8 ho minimum, c) accuracy of pressure observations comparable to that obtained with standard Arr radiosonde. (For separate abstracts on reports 93.01 and 93.03 *see items* 1–43 and 4.8–48, Ja 1950 and Aug. 1953, *MAB*, respectively.) *Subject Headings:* **1. Constant level balloons 2. Ballo research. I. Smith, James R. II. Contract W28-099-ac-241.**

5E–124 551.501.7:551.507.3

Solov'ev, IU. I., **Pervyĭ nauchnyĭ polet na vozdushnom share.** [The first scientific flight i balloon.] *Priroda*, Moscow, 40(1):73–75, Jan. **1951. DLC**—Description of the balloon ascent the academician IA. D. ZAKHAROV in June 1804, for the purpose of determining "at a maxim distance from the earth's surface" the evaporation, increase or decrease of magnetic power, behav of the magnetic needle, increase or decrease of the heating capacity of sun-rays, etc. The arti also contains excerpts from the explorer's personal account of his flight. (*Same item as* 3.8– Aug. 1952, *MAB.*) *Subject Headings:* **1. Upper air observation 2. Balloons 3. History of m teorology 4. Zakharov, IA. D.**

5E–125 551.501.7:551.507.321:551.51

Vaeth, Joseph Gordon (*O.N.R*), **200 miles up. The conquest of the upper air.** New Yo Ronald Press, **1951.** 207 p. 62 figs., chart. **DWB**—In Chap. 4 (p. 80–98) vehicles of upper research are discussed, including sounding balloons made of expansible or non-expansible mater Chap. 5 (p. 99–116) is a description of the development of polyethylene "Skyhook" balloons un sponsorship of the U. S. Navy. Performance characteristics of Skyhook balloons of various s are specified. The possibility of manned flight to 90,000 ft is considered. (For full abstract *item* 3.8–31, August 1952, *MAB.*) *Subject Headings:* **1. Sounding balloons 2. Skyhook ballo 3. Constant level balloons 4. Plastic balloons.**

1952

5E–126 551.507.3:551.

Arakawa, Hidetoshi (*Met. Res. Inst., Suginami, Tokyo*), **Basic principles of the balloon bo Feb. 1952.**] 8 p. 2 figs. **DWB**—The author acted as a meteorological advisor to the Japan army in connection with the operation of bomb-carrying constant-level balloons which were s out to the United States from Japan during the winter 1944–1945. Having burned almost all data concerning the balloon bombs at the end of World War II, he confines himself to an outlin his research into prevailing winds over Japan, the Pacific and the U. S. He also indicates the res of his studies. Best drifting level was found to be 10–12 km. Westerlies are strongest in win

Under favorable conditions 2 or 3 days will suffice for the operation. *Subject Headings:* **1. Constant level balloons 2. Balloon trajectories 3. Japanese incendiary balloons 4. Geostrophic winds.**

5E–127 551.507.321.2

Hinzpeter, Max, **Zur Aerodynamik des Radiosondeaufstieges.** [On the aerodynamics of radiosonde ascents.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 35:150–154, 1952. 4 figs., 2 tables, 5 refs., 8 eqs. **MH-BH**—The resistance of an ascending balloon and tetrahedral radar reflector is calculated and compared with measurements of upward velocity. Deviations are small and normally distributed. (*Same item as* 3.10–51, Oct. 1952, *MAB.*) *Subject Headings:* **1. Balloon research 2. Radiosonde ascents.**—*C.E.P.B.*

5E–128 551.507.321

Huch, William F. and Hakomaki, Raymond I., **Balloon cap and method of its manufacture.** *U. S. Patent Office, Patent* No. 2,602,609, July 8, 1952. [6 p.+plate]. 7 figs., 4 refs. **DP**—Relating to balloons made of thermoplastic sheet material, and assigned to General Mills, Inc., the object of the invention specified in this document is to provide a novel cap which can be manufactured without the problem of intersecting seams at the apex of the balloon. *Subject Headings:* **1. Plastic balloons 2. Patents 3. Balloon manufacturing patents. I. General Mills, Inc.**

5E–129 551.507.321.4:551.507.2

Huss, Eduard, **Die Fesselballonmethode mit Schiff als Hilfsmittel der aerologischen Grundlagenforschung.** [The captive balloon and ship as an aid to investigation of lower air layers.] *Annalen der Meteorologie*, 5(3/5):67–71, 1952. fig. **MH-BH**—A summary of the advantages of the use of a captive balloon on the Bodensee (Lake Constance) and the detailed researches carried out with it or in prospect. (*Same item as* 4.6–42, June 1953, *MAB.*) *Subject Headings:* **1. Captive balloons 2. Friedrichshafen, Germany.**—*C.E.P.B.*

5E–130 551.507.321

Misselwitz, Wolfgang, **Untersuchungen an Ballonfolien.** [Investigation of balloon foils.] *Zeitschrift für Meteorologie*, 6(8):245–252, Aug. 1952. 6 figs., 4 tables, 2 refs. **MH-BH**—As a result of high altitude balloon performance tests two tables are presented—one giving volume, linear expansion and thickness of rubber balloons as functions of height (up to 30 km), balloon weight (0.5, 1.25 and 2 kg) and rate of ascent and the other listing pull stress and molecular extensibility for various heights. The values given in the tables are discussed in detail. Bursting thickness, molecular extensibility and pull stress resistance are indicated as chief criteria of balloon quality. Effects of ultraviolet radiation, of light and of temperature are considered. The method used in making the tests is described. The effect of a balloon's form on its performance is analyzed. (*Same item as* 4.5–45, May 1953, *MAB.*) *Subject Headings:* **1. Balloon research 2. Balloon performance 3. Balloon fabrics.**

5E–131 551.507.321.2

Molded Latex Products, Inc., **High Altitude Balloon Research and Development.** Contract No. DA36-039 Sc4, Quarterly Reports No. 3–10, Feb. 1950–Jan. 1952. 8 pieces. tables. **DWB**—The purpose of the research reported in these papers is "to investigate the possibility of providing a neoprene balloon which will carry a 5 pound pay-load to an altitude of 150,000 ft during the daytime and at all seasons of the year." Laboratory and flight tests of various compounds and balloons of different sizes are described and their results tabulated. The reports include detailed discussions of manufacturing processes, of equipment used and of performance characteristics (including resistivity in respect of atmospheric factors like temperature, ozone, etc.). (For further details *see items* 3.11–49 and 4.8–47, Nov. 1952 and Aug. 1953, *MAB.*) *Subject Headings:* **1. Balloon research 2. Balloon performance 3. Sounding balloons 4. Plastic balloons. I. Contract DA36-039-Sc4.**

5E–132 551.507.321

Moore, Charles B. (*Gen. Mills Aero. Res. Lab., Minneapolis, Minn.*), **Plastic balloons: a platform for experiments in the upper atmosphere.** (In: U. S. School of Aviation Medicine, Randolph Field, Texas, **Physics and medicine of the upper atmosphere.** Albuquerque, **1952.** p. 395–404. 3 figs., table, 13 refs.) **DLC**—A brief history of the development of plastic balloons and of the physical properties is presented. A detailed account is given of the construction of "skyhook" balloons developed by General Mills, Inc., the preparation for flight, flight behavior of the balloon and of its tracing and recovery. A table with data on dimensions and ceiling altitude of polyethylene balloons (General Mills type) is included. (*Same item as* 4.6–41, June 1953, *MAB.*) *Subject Headings:* **1. Plastic balloons 2. Skyhook balloons 3. Balloon recovery 4. General Mills Aeronautical Research Laboratories.**—*I.L.D.*

5E–133 551.507.321.2

Rössler, Fritz, **Untersuchungen an Gummiproben und Registrierballonen.** [Investigations o rubber samples and sounding balloons.] *Germany. Deutsche Demokratische Republik. Meteoro logischer Dienst, Veröffentlichungen*, No. 6, **1952.** 68 p. 20 figs., 21 tables. **DWB**—A compre hensive technical investigation made in 1944 at the meteorological observatory at Wilhelmshaven Germany. Different samples of natural and artificial rubber balloons were tested in the laboratory and during ascents. The influence of rubber quality and thickness, and of temperature, ozone and ultraviolet radiation on the heights reached are discussed. The bursting height was found inversely proportional to the initial thickness. Balloons should be of large diameter and thin rubber. (*Same item as* 4.4–46, April 1953, *MAB.*) *Subject Headings:* **1. Balloon fabrics research 2. Balloon bursting height 3. Germany.**—*A.A.*

5E–134 551.507.32

Tufts College. Dept. of Electrical Engineering, **Simplification of Moby Dick equipment; Preparation of pilot model; Production of 20 units for training flights.** Contract AF 19(122)-63 Progress Report, No. 12, March 15–June 15, **1952.** 22 p. 12 figs. **DWB**—In order to make more efficient production on a large scale and flight performance for constant level balloon soundings over ocean areas, the Moby Dick equipment was redesigned and 20 units manufactured and tested. A pilot model is described and several large detailed photographs of separate parts included in the report, along with circuit diagrams, etc. The features developed in this manner are: 1) packaging 2) control box, 3) codes, 4) ballast hoppers and 5) separation unit. Specifications are given and equipment for training flights described. *Subject Headings:* **1. Constant level balloons 2. Moby Dick design. I. Contract AF 19(122)-63.**—*M.R.*

5E–135 551.507.32

Väisälä, Vilho, **Method of making balloons.** *U. S. Patent Office, Patent* No. 2,614,293, Oct. 21 **1952.** [3 p.+plate], 4 figs., 5 refs. **DP**—According to the author's definition "it is the objec of the invention to provide an improved method for making balloons as great as desired by the dipping process while preventing the forms becoming too heavy and difficult to handle." *Subject Headings:* **1. Balloons 2. Patents 3. Balloon manufacturing patents.**

1953

5E–136 551.507.32

Better weather balloons coated with plasticizer. *Science News Letter*, 64(6):88, Aug. 8, 1953 **DWB**—Brief note on *U. S. Patent Office, Patent* No. 2,646,370 of Eric Nelson (Madison, N. J. which has been assigned to the U. S. Army. The technique specified in the patent is a treatment of neoprene film with a plasticizer which protects the balloon against freezing. Freezing, it is explained hitherto prevented neoprene balloons from reaching the same height at night as during daytime. (*Same item as* 5.2–46, Feb. 1954, *MAB.*) *Subject Headings:* **1. Balloon performance 2. Patents 3. Balloon fabric patents. I. Nelson, Eric.**

5E–137 551.507.32

Dungan, Raymond M. and Hakomaki, Raymond I., **Balloon and method of inflating same** *U. S. Patent Office, Patent* No. 2,635,835, April 21, **1953.** [5 p.+3 plates]. 16 figs., 2 refs. **DP**— Method of performing the difficult operation of inflation on very large high-altitude balloons described and illustrated in all technical detail. The patent was assigned to General Mills, Inc. *Subject Headings:* **1. Plastic balloons 2. High altitude balloons 3. Balloon inflation 4. Patents 5. Balloon inflation patents. I. General Mills, Inc.**

5E–138 551.507.321.

Herz, A. J. and Tennent, R. M., **Ballooning for research.** *Science News*, London, 27:46–5 **1953.** (pub. by Penguin Books.) 4 figs. **DWB**—Account of flight peculiarities of open-necked and closed balloons used for radiosonde and cosmic ray investigations, "Skyhook" balloons, etc. tracking and height measurements. (*Same item as* 4.8–45, Aug. 1953, *MAB.*) *Subject Headings:* **1. Sounding balloons 2. Skyhook balloons.**—*C.E.P.B.*

5E–139 551.507

Hopper, V. D. and Wilson, A. R. W. (*Melbourne Univ.*), **A method for obtaining long exposures at high altitudes using rubber balloons.** *Journal of Scientific Instruments*, London, 30(6):211–21 June **1953.** 2 figs. **DLC**—A valve is described whereby rubber balloons can be maintained at constant height for prolonged periods of time. The valve is placed in the neck of the balloon; it operated by a string attached inside the balloon diametrically opposite the neck. The 2,000 balloons were maintained around 90,000 ft for over 15 hours. Rubber balloons are only a fracti

of the cost of inexpansible plastic balloons usually employed for constant level flights. *Subject Headings:* **1. Constant level balloons 2. Balloon accessories.**

5E–140 551.507.321

Huch, William F., **Balloon with no load ring.** *U. S. Patent Office, Patent* No. 2,598,696, June 3, 1952. [4 p.+2 plates]. 8 figs., 2 refs. Also: **Variable volume balloon and method of its manufacture.** *Ibid.*, No. 2,612,328, Sept. 30, 1952. [7 p.+5 plates]. 11 figs., 4 refs. And: **Balloon and method of packing balloons.** *Ibid.*, No. 2,625,834, April 21, 1953. [4 p.+2 plates]. 10 figs. And: **Multiple gore balloon manufacturing process.** *Ibid.*, No. 2,656,293, Oct. 20, 1953. [7 p.+3 plates]. 20 figs., ref. **DP**—Patents assigned to General Mills, Inc. and relating to high altitude meteorological balloons are specified. Their objects are: 1) elimination of rigid ring by attachment of load line to sheet material of conically shaped balloon, 2) manufacturing of multiple-gore balloons of different volumes and shapes (for different requirements of performance) with the aid of a single gore pattern, 3) method of packing, which facilitates operations during launching (lower, uninflated portion is enclosed in container which may be left in place during initial stages of inflation and launching), 4) manufacturing of multiple-gore balloons from a continuous strip of material having straight parallel longitudinal edges. *Subject Headings:* **1. Plastic balloons 2. High altitude balloons 3. Patents 4. Balloon manufacturing patents. I. General Mills, Inc.**

5E–141 551.507.3

Mastenbrook, Henry J. and Anderson, Albert D., **Evaluation of the Transosonde System. Report for period Jan. 1952–March 1953** [and] **Data Report for period April–Aug. 1953.** *U. S. Naval Research Laboratory, NRL Memorandum Reports*, No. 171 and 240, May 27 and Nov. **1953.** 92 and 99 p. 43 figs. (many fold.), numerous tables, 11 refs. **DWB**—1) This report describes the first field tests of the Transosonde System (trans-ocean soundings as suggested by Capt. HOWARD T. ORVILLE). Balloons launched from Tillamook, Oregon in the Fall of 1952 were controlled to float at the 300 millibar level for periods up to four days. Each balloon carried a transmitter which radiated a signal of 50 watts at frequencies between 6 and 20 megacycles. The balloons were tracked by a high frequency radio direction finding network. 2) Detailed flight data for 9 flights launched at Minneapolis between April 24 and July 23, 1953 are presented. The balloons were specially designed by General Mills, Inc., according to flight specifications (39-foot natural shape balloons of 24,000 cu ft volume made of 2.5 mm polyethylene laminate and having gross lift of 1,700 lbs). One balloon (Model 371E) was made to produce circumferential stresses at flight level to check its stability against the others (391E and F) which had no circumferential stress. Most flights terminated at from 60 to 88 hours, just short of the European coast. Longest trajectory was 6,500 miles (passed over Delaware, Bermuda, Lesser Antilles and landed in Canaries). *Subject Headings:* **1. Transosondes 2. Constant level balloons 3. Balloon trajectories 4. Plastic balloons.**—*M.R. and from authors' abstract.*

5E–142 551.501:551.557:551.507.321.2

The measurement of upper winds by means of pilot balloons. (In: Middleton, W. E. Knowles and Spilhaus, Athelstan F., **Meteorological Instruments.** 3rd ed., Univ. of Toronto Press, **1953.** pp. 166–196. 30 figs., 22 refs., 22 eqs.) **DWB**—In discussing balloons for upper wind measurement the authors describe: a) materials and manufacture (rubber balloons made with dipping process and hollow-mold process, neoprene, and polyethylene balloons), b) bursting thickness, c) gases used for inflation, d) inflation of balloons (with formulas for obtaining rate of ascent) and e) illumination for night-time ascents. Theodolites and radar tracking methods are discussed in detail. The use of controlled-altitude free balloons is touched upon. *Subject Headings:* **1. Pilot balloons 2. Constant level balloons 3. Upper air wind measurement.**

SUPPLEMENTARY MATERIAL

5E–143 551.501.9:551.587

Assman, Richard, **Das Königlich Preussische Aeronautische Observatorium Lindenberg.** [The Royal Prussian Aeronautical Observatory Lindenberg.] Brunswick, **1915.** 284 p. 235 figs., tables, refs. **DWB**—This comprehensive report on the observatory's equipment and activities includes description and illustration of free balloons (p. 87–89), captive balloons (p. 154–170), sounding balloons (p. 174–194) and pilot balloons (p. 202–206). Material and performance of rubber balloons is discussed in detail. *Subject Headings:* **1. Lindenberg Aerological Observatory 2. Balloons.**

5E–144 551.501.7

Molchanov, P. A., **Aufgaben und Methoden zur Erforschung der Atmosphäre im Gebiet der Arktis.** [Objectives and methods of investigating the atmosphere in the Arctic region.] *Petermanns Geographische Mitteilungen, Ergänzungsheft,* No. 201:52–55, **1929.** 3 figs. **DLC**—Aerological methods applicable from airships in Arctic latitudes are described. They include: 1) meteorograph suspended on a rope, 2) release of clusters of no-lift pilot balloons (up to 1,000 at a time) made of cloth and provided with polyglot report sheets, 3) sending up of captive balloons to altitudes of 10–12 km (this technique is not applicable on small airships) and 4) radio meteorograph used on captive or free sounding balloons (this technique is applicable on airships of any size and on free balloons). *Subject Headings:* **1. Upper air observation 2. Aerological techniques 3. Balloons 4. Airships 5. Arctic Region.**

5E–145 551.507.321.2

Nicholson, Arnold, **Wanderers in the sky.** *Country Gentleman,* Philadelphia, 108(8):7–9, 60–61 Aug. **1938.** Illus. **DLC**—The two-year history of the use of radiosondes in the U. S. (the first such instrument was completed in 1936) is summed up. The article includes description of Dewey & Almy latex rubber balloons used as single units and in clusters. JEAN PICCARD's flight over a distance of 110 mi with a cluster of 8 small balloons is mentioned. *Subject Headings:* **1. Sounding balloons 2. Balloon clusters 3. Radiosondes.**

5E–146 551.501.7:551.507.321

U. S. War Dept., **Meteorological balloons.** *U. S. War Dept., Technical Manual* TM 11-2405 April 24, **1944.** 5+29 p. 14 figs. **DWB**—Manual containing complete practical instructions for the operation and maintenance of ceiling, pilot and sounding balloons. *Subject Headings:* **1. Balloon observers manuals 2. Balloon operation 3. Balloon maintenance.**

5E–147 551.507.32

Dewey & Almy Chemical Co., Meteorological and Scientific Balloon Div., **Darex meteorological balloons.** Cambridge, Mass., **1952.** 60 p.+36-page catalog. tables, diagrs., graphs, illus., photos **MH-BH**—A profusely illustrated informative pamphlet dealing with aerology in general, the use of balloons in meteorology, balloon operations, the radiosonde, the weather map (list of codes and symbols included) and balloon research and production facilities of Dewey & Almy Chemical Co. The catalog section gives technical details (including altitude curves for different rates of ascent) on Darex ceiling, pilot, sounding and captive (spherical and air-foil) balloons as well as Darex inflation equipment. *Subject Headings:* **1. Balloons 2. Balloon manufacture 3. Balloon catalogs**

5E–148 551.501.7:551.507.321.

Canada. Meteorological Div., **Pilot balloon observations.** *Canada. Meteorological Div., Cir* 2407, Ins-58, Dec. 30, **1953;** *Instrument Manual* 60, **1954.** 44 p. 13 figs., tables. **DWB**—These detailed instructions for all phases of upper wind observation and computation include description of equipment (pilot balloons, theodolites, plotting boards, etc.) and its operation. Details on balloons, hydrogen, filling devices and operations, and lighting units are given on p. 3–17. *Subject Headings:* **1. Pilot balloons 2. Balloon illumination 3. Pilot balloon operation 4. Observers manuals.**

5E–149 551.507.3 551.507.321.

Berry, F. A. (*U. S. Fleet Weather Central, Norfolk, Va.*), **Constant-level-balloon and meteorological trajectory studies at project AROWA.** *American Geophysical Union, Transactions,* 35(2):36 April **1954. MH-BH**—Pre-publication abstract of a paper delivered at the 35th annual meeting of the American Geophysical Union. In addition to dealing with development of constant level balloons as a vehicle for transosonde equipment the author described tests made with "pillow balloons" in connection with tropical research. These ruggedly constructed, inexpensive, low-level plastic balloons are launched from aircraft in flight and tracked by air-borne radar. When used in hurricanes these no-lift balloons were tracked over distances up to 34 mi. *Subject Headings:* **1. Constant level balloons 2. No-lift balloons 3. Balloon trajectories 4. Pillow balloons 5. Project AROWA.**

5E–150 551.508.25:551.507.321.

Burgwald, G. M. and Reiffel, L. (*Armour Res. Foundation, Ill. Inst. of Tech., Chicago*), **Balloon-borne radiation telemetering system.** *Electronics,* Albany, N. Y., 27(5):138–141, May **1954.** 4 figs photos. **DLC**—A scintillation counter measuring the low-energy gamma-ray component of cosmic radiation is the basic part of the telemetering system described in this report. Technical details of the air-borne and ground units are given in text, photographs and circuit diagrams. The 85-foot diameter non-expansible plastic balloons (General Mills, Inc.) carry the instruments to altitudes u

to 115,000 ft. The instruments are then cut loose from the balloon and parachuted at a predetermined time. A photograph of a balloon and a diagram of instrument suspension (balloon rigging) are presented. *Subject Headings:* **1. Cosmic ray instruments 2. Sounding balloons 3. Plastic balloons.**

5E–151 551.507.321

Delacoste & Cie., **Ballons météorologiques. Meteorological balloons.** [1954?] 1 leaf fold. In French and English. **MH-BH**—Technical characteristics (weight, diameter when flaccid, diameter at burst, neck diameter) and details of performance are given for four types of balloons: 1) the 125 g pilot balloon which usually reaches an altitude of 15 km, 2) the 450 g sounding balloon which carries loads up to 2 kg to 15–20 km, 3) the 700 g balloon (3 kg to 20–25 km) and 4) the 2,000 g balloon (4–6 kg to 30–35 km). *Subject Headings:* **1. Balloon performance 2. Balloon catalogs.**

5E–152 551.507.321

Guide Bridge Rubber Co., Ltd., Bury, England, **Beritex seamless balloons.** London [1954?] 1 leaf fold. tables, photos. **MH-BH**—The rubber balloons whose technical details and performance characteristics are specified in this pamphlet are ceiling, pilot, sounding and high-altitude balloons. The high-altitude balloons are designed to carry standard radiosondes or cosmic-ray equipment to 110,000 ft or more. *Subject Headings:* **1. Balloons 2. Balloon catalogs.**

5E–153 551.507.3:551.510.53

Gildenberg, Bernard D. (*Holloman Air Force Base, New Mexico*), **The non-extensible balloon as an upper air research vehicle.** U. S. Air Research and Development Command, First Annual Science Symposium, Eglin Air Force Base, Florida, May 18–20, 1953, p. 9–11, [1953]. **DWB**—A succinct summary of the progress to date in development of the "constant level" or non-extensible balloon for carrying heavy loads of scientific equipment (500 pounds or more) for 12 to 96 hours or more at heights of 75,000 to 120,000 ft, with only small hourly loss in altitude. Most of the several hundred balloons released from Holloman Air Development Center in New Mexico in the past 6 years have been made of polyethylene, and are often called Skyhook balloons. The biggest—the Giant Skyhook—is 178 ft in diameter and 287 ft long when deflated and weighs 630 pounds with a volume of 3,000,000 cu ft. *Subject Headings:* **1. Constant level balloons 2. Polyethylene balloons 3. Upper atmosphere research 4. Skyhook balloons 5. Project Skyhook.**—*M.R.*

PART III. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Note: The contents of periodicals included in this section are for information only, and will not be listed in the monthly indexes until abstracted. When material is furnished in advance of date of publication, the pagination may be omitted.

Acta Geophysica Polonica, Warsaw, Volume 1, Number 1, 1953.

Kopcewicz, Teodor: **On two new types of universal anemographs,** p. 7–20.

Konček, Mikuláš: **Messungen der Nebelfrostablagerungen auf der Lomnitzer Spitze und ein Instrument zur automatischen Registrierung der Nebelfrostablagerungen,** [Measurement of hoar frost deposits at the Lomnitzer Peak, and an instrument for automatic recording of hoar frost depositions], p. 21–31.

Smoraski, Władysław: **Electricité atmosphérique à Poznań,** [Atmospheric electricity in Posnan], p. 32–43.

Stenz, Edward: **Strahlungsdurchlässigkeit einiger Seen Polens,** [Radiation transmissibility of some Polish lakes], p. 44–55.

Number 2, 1953.

Stenz, Edward: **The upper east wind of Copernicus,** p. 72–81.

Kopcewicz, Teodor: **On the influence of wind velocity on the psychrometric constant,** p. 82–93.

Gorczyński, Władysław: **Nouveaux modèles des solarimètres,** [New models of solarimeters], p. 94–99.

Mackiewicz, Maria: **The space distribution of insolation in Poland,** p. 100–121.

Number 3/4, 1953.

Parczewski, Władysław: **Les conditions thermodynamiques dans la couche inférieure de l'atmosphère d'après les vols des modèles réduits,** [Thermodynamic conditions in the lower layer of the atmosphere according to flights of reduced models], p. 147–161.

Lambor, Julian: **Maksymalne natężenei deszoczów o okréslonym prawdopodobiénstwie pojawania się na terytorium polski,** [On maximum intensity of rainfalls of a determined probability of occurrence in Poland], p. 162–170.

Kalinowska, Zofia: **Some remarks on the secular variations of the earth's magnetic field in Poland,** p. 208–217.

Akademiia Nauk SSSR, Institut Geografii, Mikroklimaticheskie i klimaticheskie issledovaniia v Prikaspiĭskoĭ Nizmennosti [Microclimatic and climatic investigations on the Caspian Plain] Moscow 1953.

Vivitskii, G. N.: **O prirode sukhoveev,** [The nature of dry winds], p. 5–17.

Dzerdzeevskii, B. L.: **Predvaritel'nye dannye o tsirkuliatsii atmosfery, v dni sukhoveev v Prikaspii,** [Preliminary data on the atmospheric circulation in the Caspian Region during days with dry winds], p. 18–29.

Bugaev, V. A.: **Malopodvizhnye antitsiklony,** [Slow-moving anticyclones], p. 30–41.

Fel'dman, IA. I.: **Nekotorye rezul'taty mikroklimaticheskikh issledovaniĭ v Prikaspiĭskoĭ Nizmennosti,** [Some results of microclimatic investigations in the Caspian Plain], p. 42–53.

Galakhov, N. N.: **Sviaz' khoda otdel'nykh meteorologicheskikh elementov s pogodoĭ,** [The relationship between the variation of meteorological elements and the weather], p. 54–64.

Ioganson, V. E.: **Opyt izucheniia ispariaemosti v Prikaspii,** [A study of evaporation in the Caspian Region], p. 65–78.

Zavarina, M. V.: **Sukhoveĭ iugo-vostoka evropeĭskoĭ chasti SSSR,** [Dry winds of southeast European U.S.S.R.], p. 79–85.

Liakhov, M. E.: **Mikroklimaticheskie nabliudeniia v raĭone Chernogo IAra Astrakhanskoĭ Oblasti,** [Microclimatic observations in the District of Chernyĭ Iar, Astrakhan Region], p. 86–93.

Isherskaia, E. V.: **Nekotorye nabliudeniia nad mestnym klimatom doliny reki Volgi,** [Observations on the local climate of the Volga River Valley], p. 94–99.

Monin, A. S.: **O mekhanizme nagrevaniia vozdukha v otkrytoĭ stepi,** [The mechanism of warming of the air in the open steppe], p. 100–123.
CHudnovskii, A. F.: **Mikroklimat i teplovoĭ balans oroshaemogo polia,** [Microclimate and heat balance of an irrigated field], p. 124–153.
Rozhanskaia, O. D.: **Raschet summarnogo isparenііa s oroshaemykh poleĭ, zaniatykh zernovymi kul'turami,** [Computation of total evaporation in irrigated fields cultivated with grain crops], p. 154–161.
Kir'iashkina, Z. I. and Nosova, V. A.: **Elektroliticheskie gigrometry,** [Electrolytic hygrometers], p. 163–167.

Alaskan Science Conference, 2nd, Mt. McKinley National Park, September 4–8, 1951, Proceedings, Pub. 1953?

Johnson, H. M.: **Preliminary ecological studies of microclimates inhabited by the smaller arctic and subarctic mammals,** p. 125–131.
Anderson, Anton A.: **Construction and maintenance problems encountered on the Alaska Railroad,** p. 136–149.
Ray, Louis L.: **Permafrost research problems,** p. 178–183.
Koenig, Lawrence S.: **Ice Islands in the Arctic Ocean,** p. 263–270.
Stinchfield, Phillip R.: **Typical progress of weather formations over Alaska,** p. 270–272.
Bensin, Basil M.: **Created microclimate for growing warm-season vegetables with solar reflectors and radiators in Alaska,** p. 272–273.
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Heppner, James: **Association of absorption and sporadic E ionization with aurora at high latitudes,** p. 278–279.
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Church, Phil Edwards: **Micrometeorological problems important to Alaska and vicinity,** p. 283–287.
Herman, Louis and Leinbach, Harold: **Photographic study of the green and infra-red emissions of the polar aurora,** p. 287.
Elvey, C. T.: **Optical phenomena of the upper atmosphere,** p. 288.
Stowell, David: **History of Alaskan weather observations,** p. 295–298.
Wilson, William S.: **On activities at the Geophysical Institute,** p. 298–302.

American Geophysical Union, Transactions, Volume 35, Number 2, April 1954.

Black, Robert F.: **Precipitation at Barrow, Alaska, greater than recorded. Discussion by Walter T. Wilson,** p. 203–207.
Damon, Paul E. and Kuroda, P. K.: **On the natural radioactivity of rainfall,** p. 208–216.
Trimble, G. R. and Weitzman, Sidney: **Effect of a hardwood forest canopy on rainfall intensities,** p. 226–234.
Zingg, A. W.: **The wind erosion problem in the Great Plains. Discussion by Louis M. Glymph, Jr.,** p. 252–258.

American Meteorological Society, Bulletin, Volume 35, Number 2, February 1954.

George, J. J.: **On "Weather is the nation's business,"** p. 43–47.
Wexler, R.; Reed, R. J. and Honig, J.: **Atmospheric cooling by melting snow,** p. 48–51.
Vaughan, Harry C.: **The spontaneous freezing temperatures of melted snow and of small water drops,** p. 52–55.
Randall, D. L.: **A study of some of the meteorological effects on radio propagation at 96.3 Mc between Richmond, Va. and Washington, D. C.,** p. 56–59.
Smith, Walter J. and Hofflich, Nancy J.: **The carbon film electric hygrometer element,** p. 60–62.
Mather, John R.: **The determination of soil moisture from climatic data,** p. 63–68.
Gill, Gerald C.: **A fast response anemometer for micrometeorological investigations,** p. 69–75.

Angewandte Meteorologie, Berlin, Volume 2, Number 1, February 1954.

Unger, K.: **Zur Abschätzung von Verdunstungsunterschieden verschiedener Pflanzenbestände am natürlichen Standort,** [On the estimation of differences of evaporation of different natural plant stands], p. 1–14.
Hesse, W.: **Der Einfluss meteorologischer Faktoren auf die Transpiration der Pfefferminze (*Mentha piperita* L.),** [The influence of meteorological factors on the transpiration of the peppermint], p. 14–18.

Jancke, O.: **Wärmemessungen im Weinberg während der Hitzewelle im Juni-Juli des Jahres 1952 unter besonderer Berücksichtigung ihrer Wirkung auf den Sauerwurmbefall**, [Warmth measurements in Weinberg during the heat wave of June–July 1952 with special reference to its effect on the incidence of sour-worm], p. 19–23.

Schrödter, H.: **Agrarmeteorologische Untersuchungen im Rahmen der Antibiotica-Forschung in der Pflanzenpathologie (Vorläufige Mitteilung)**, [Agro-meteorological investigations in the province of antibiotics investigation in plant pathology (advance communication)], p. 23–26.

Unger, K.: **Zur klimatologischen Analyse der Kartoffel-Abbau- und Gesundheitslagen**, [On the climatological analysis of potato disease and health sites], p. 26–32.

Annalen der Meteorologie, Medizin-meteorologische Hefte, Number 9, 1953 (1954).

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